Assessment of Dam Safety of Coal Combustion Surface Impoundments

Indianapolis Power & Light Company

Eagle Valley Generating Station

4040 Blue Bluff Road
Martinsville, Indiana

Prepared for:

U. S. Environmental Protection Agency

Washington, D. C.

November 15, 2010

CDM Project No.: 76658.1801.034.SIT.EAGLE

Preface

The assessment of the general condition of the impoundments is based upon available data and visual observations. Detailed investigations and analyses involving topographic mapping, subsurface investigations, testing and detailed computational evaluations are beyond the scope of this report.

In reviewing this report, it should be realized that the reported condition of the impoundments is based on observations of field conditions at the time of assessment, along with data made available to the assessment team. In cases where an impoundment may have been lowered or drained prior to the assessment, such action, while improving the stability and safety of the impoundment, removes the normal load on the structure and may obscure certain conditions, which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is critical to note that the condition of impoundments depends on numerous and constantly changing internal and external conditions and is evolutionary in nature. It would be incorrect to assume that the present condition of the impoundment at the time of the assessment is representative of the condition of the impoundment at some point in the future. Only through continued care and assessment can there be any chance that unsafe conditions will be detected.

Prepared By:

CDM

I certify that the management unit (s) referenced herein have been assessed on April 28 and 29, 2010:

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Section 1
Introduction & Project Description

1.1 Introduction

CDM was contracted by the United States Environmental Protection Agency (USEPA) to perform site assessments of selected coal combustion waste (CCW) surface impoundments. As part of this contract, CDM performed a site assessment of five CCW impoundments at the Eagle Valley (EV) Generating Station, owned and operated by Indianapolis Power & Light Company (IPL).

The EV Generating Station is located north of the Town of Martinsville, Morgan County, Indiana as shown on **Figure 1**. The state boundary with Illinois and Kentucky is approximately 60 miles west and 92 miles south of the site, respectively. The Town of Martinsville, Indiana is approximately five miles downstream (south) of the site as shown on **Figure 2**.

CDM made a site visit to the EV Generating Station on April 28 and 29, 2010 to collect relevant information, inventory the impoundments, and perform visual assessments of the impoundments. CDM representatives Michael L. Schumaker, P.E. and Michael P. Smith were accompanied by the following individuals:

Company	Name and Title
IPL	Nysa L. Hogue, Senior Environmental Coordinator
IPL	David B. Abrams, Technical Services Team Leader
IPL	Rick Jacobs, Lead Engineer
IPL	J. Kyle Noah, Principal Scientist

1.2 State Regulation

The Indiana Department of Natural Resources (IDNR) Water Division is responsible for the State's dam safety program. It is our understanding that to date IDNR has not been actively involved in the regulation of CCW impoundments. IPL staff stated there are no State inspection reports for the impoundments at EV Generating Station.

1.2.1 Permits

The IPL EV Generating Station was issued a permit under the National Pollutant Discharge Elimination System (NPDES) authorizing discharge to the White River in accordance with effluent limitations, monitoring requirements, and other conditions set forth in the permit. The station's current permit will expire December 31, 2011. The permit number is IN0004693.

1.3 Datum

Elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29). Directional coordinates are referenced to magnetic north.

1.4 Site Description and Location

1.4.1 CCW Impoundment Construction and Historical Information

The EV Generating Station began operation about February 1949. The CCW is generated by Unit 3 (on line since 1949), Units 4 and 5 (on line since 1953), and Unit 6 (online since 1956). Approximately 1,900 tons of coal is burned daily producing approximately 190 tons of CCW.

The original CCW impoundment was commissioned in 1949 at El. 607. The impoundment was constructed in the vicinity of the footprint of current Ponds A, B and C to the west of the Indiana Southern Railroad tracks. A typical cross-section of the embankment is presented in **Figure 3**. The original embankment was constructed with native site soils to approximately 4 to 5 feet above existing grades to a crest elevation of approximately El. 608. The embankment had a 10-foot-wide crest and 1.5 Horizontal:1 Vertical (1.5H:1V) side slopes.

In 1956, an impoundment was commissioned east of the railroad in the current footprint of Ponds D and E. The embankment was constructed approximately 1 to 7 feet above existing site grades with native soil to a crest elevation of approximately El. 612. The embankment had a 10-foot-wide crest with 1.5H:1V side slopes. An overflow weir was constructed along the western embankment to allow water to flow into the adjacent western impoundments.

Between 1962 and 1970, the east impoundment embankment was raised multiple times with compacted ash until the crest reached elevation El. 625.

In about 1991, the west impoundments were reconfigured to create the current footprint of Ponds A, B and C. In about 1979/1980, the west pond was established within the existing footprint of the impoundment, and the crest was raised to approximately elevation El. 610. In about 1980/1981, the crest was raised to elevation El. 619 around the perimeter using compacted ash. The embankment had a 10-foot-wide crest and 2H:1V side slopes on the interior and 3H:1V side slopes on the exterior. Based on plans provided to CDM, a 6-foot-thick clay core was constructed in the middle of the embankment. The depth of the clay core is unknown. In 1981, as part of the crest raise construction, a diversion embankment was also constructed in the area of the current Pond A/C divider embankment.

From about 1981 to 1982, the east impoundment (Ponds D and E) was unofficially capped and regraded with 4H:1V side slopes to approximately elevation El. 627. The surface was mulched and seeded per the drawings reviewed by CDM.

In about 1991, the current configuration of Ponds A, B, and C was commissioned. The embankment around the perimeter of Pond A was raised to crest elevation El. 629 using compacted ash. A typical cross-section of the embankment is presented in

Figure 3. Based on drawings provided to CDM, a 6-foot-thick clay core or slurry trench was installed in the middle of the embankment and was keyed a minimum of 2 feet into native soil. The embankment generally has a 10-foot-wide crest and 2H:1V side slopes on the interior and 3H:1V side slopes on the exterior. The current configuration and operation of Ponds A, B and C is discussed below.

In 2000, the east impoundment (Pond D) was reactivated. The embankment around the pond was regraded from the toe up with 3H:1V side slopes, and the crest was raised to elevation El. 633 using compacted ash. The embankment crest was 20 feet wide and the interior slope was 3H:1V. In 2003, Pond D was reconfigured to form Ponds D and E by creating an internal divider embankment that runs east to west. The modifications were constructed with a 20-foot-wide crest and 3H:1V side slopes using compacted ash. In 2005, the embankment around the perimeter of Pond D was raised to elevation El. 643 using compacted ash. A typical cross-section of the embankment is presented in **Figure 4**. The embankment has a 20-foot-wide crest with 3H:1V side slopes.

In February 2007, the internal divider embankment between Ponds D and E failed causing the north embankment of Pond E to overtop. Following the failure, Ponds D and E were repaired and brought back in service by December 2007. In January 2008, the internal divider embankment failed again in a similar manner to the first failure causing the embankment of Pond E to overtop. Ponds D and E were being repaired at the time of the site visit. The two failures, repair work, and proposed configuration and operation of Ponds D and E are discussed below.

1.4.2 Current CCW Impoundment Configuration

The impoundments at the EV Generating Station currently are used as settling ponds for CCW waste and other plant wastes. CCW wastes sluiced into the impoundments include:

- Bottom ash;
- Fly ash;
- Boiler slag;
- Ash and & Pyrite system;
- Boiler blowdown; and
- Boiler, condenser, air-preheater, and cooling cleaning wastes.

Other plant wastes sluiced into the ash ponds include liquids from:

- Plant sumps;
- Floor drains;
- Stormwater runoff;
- Water treatment wastes;
- Metal cleaning wastes;

- River dredging;
- Laboratory and sampling streams;
- Service Water; and
- Demineralized water.

There are currently five impoundments (Ponds A through E) at the EV Generating Station as shown on **Figure 5**.

Currently the west impoundments consists of Pond A, Pond B, and Pond C. Pond A, Pond B, and Pond C are approximately 19, 13, and 8 acres in size, respectively. The crest elevation of the three impoundments is approximately El. 629, El. 619, and El. 619 respectively. The water levels in Pond A, Pond B, and Pond C are generally operated at a fixed elevation of approximately El. 626, El. 616, and El. 610, respectively.

Two (2) 10-inch-diameter High Density Polyethylene (HDPE) pipes sluice CCW waste into Pond A (Photo 6). In addition, a third 10-inch-diameter HDPE pipe sluices plant wastes into Pond A (Photo 10). Pond A is used as the primary settling pond. Floating booms were installed in the pond to direct flow and increase the settling time in the pond. Pond A is connected to Pond B by two (2) 30-inch-diameter Corrugated Metal (CMPs) with an invert elevation of El. 626 (Photo 28, 29 and 30). At the pipe inlets, there is a floating boom wrapped around the inlets and vertical pipe T's are connected to the ends to serve as a hood to reduce the potential for surface debris from clogging the pipes. IPL staff stated that a low spot in the crest in Pond A is an emergency overflow spillway (Photo 28). The spillway is approximately 50 feet wide with the crest at El. 628. This "emergency spillway" is not included on any design plans.

Pond B is used as a secondary pond for finer material to settle out. There are also floating booms installed in Pond B to increase the settling time in the pond prior to discharging into Pond C. Along the interior slope of the western embankment, floating booms consisting of telephone poles were installed to reduce wave action on embankment slopes. Pond B is connected to Pond C by two (2) 30-inch-diameter CMPs with an invert elevation of El. 616.

Pond C is used as a final settling pond before water is discharged into the discharge canal at Outfall 103 (Photo 66). Water from Pond B and Pond E is conveyed to Pond C. A 36-inch-diameter pipeline carries flow from an inlet structure located in the northwest corner of Pond E to an outlet located in Pond C. Similar to Ponds A and B, floating booms were installed in Pond C to increase the settling time in the pond prior to discharge. Three telephone poles were also installed in front of the inlet structure in Pond C to reduce the potential for surface debris from entering the structure. The outlet structure in Pond C consists of a concrete box structure with stoplogs at the inlet to control flow (Photo 54). The outlet structure discharges into a 24-inch-diameter conduit. A butterfly valve located at the outlet structure catwalk can also be

used to control flow. The butterfly valve appeared to be maintained and could be operated with little effort.

The east impoundments consist of Pond D and Pond E. Pond D and Pond E are approximately 16 and 4 acres in size, respectively. The crest elevation of the two impoundments is approximately El. 643 and El. 633, respectively. Currently Ponds D and E are dry and repairs are under construction. The proposed water level in Pond D after the repairs are completed is elevation El. 626. IPL has contractors filling Pond E with compacted ash and reinforcing the internal divider embankment between Pond D and Pond E but is not officially closing Pond E under any state or federal regulations. IPL may reactivate Pond E in the future.

The ash in Pond E will be graded up from elevation El. 633 to El. 643, as shown in **Figure 4**. The repair plans indicate that the compacted ash will be covered with a 12-inch-thick layer of compacted clay and a 4-inch-thick topsoil layer. A conduit consisting of 30-inch-diameter HDPE pipe with 8-foot-square anti-seep collars at 50-feet on center will be constructed through the compacted ash in Pond E to the existing inlet structure in the northwest corner of the pond. Water from Pond D will be diverted through the conduit to the outlet structure and into Pond C. IPL staff stated upon completion of the repairs, Pond D is anticipated to be used on an "emergency" basis, i.e. when plant operating conditions make it absolutely necessary, or when Pond A and Pond B need to be taken offline for maintenance. A butterfly valve located at the outlet structure catwalk in Pond E can be used to control flow from Pond D to Pond C. The butterfly valve appeared to be maintained and could be operated with little effort.

1.4.3 Other Impoundments

No other impoundments were identified at the EV Generating Station.

1.5 Previously Identified Safety Issues

Based on our review of the information provided to CDM and as reported by EPA, there have been two identified impoundment-related safety issues at the EV Generating Station within the last 10 years. A summary of the two safety issues is discussed below.

1.5.1 February 14, 2007 Failure

On February 14, 2007, the internal divider embankment between Pond D and Pond E failed. No documentation of this failure was available for review. Based on the Causal Analysis report prepared by BT SQUARED, dated October 15, 2008, the water level in Pond D was probably at the invert of the outlet pipes (El. 639.5) that were constructed through divider embankment D/E. BT SQUARED reported that the failure appeared to occur at the eastern reach of internal divider embankment D/E resulting in a semi-circular bowl-shaped feature. Subsequently, the north embankment of Pond E

breached resulting in an uncontrolled release of 30 million gallons of water into the discharge canal. BT SQUARED attributed the failure of divider embankment D/E to slope instability combined with piping erosion of the flyash at the north toe of divider embankment D/E.

1.5.2 January 30, 2008 Failure

IPL began repairs and reconstruction of the internal divider embankment D/E and the north embankment of Pond E in the summer of 2007. Construction was completed by November 2007, and the facility was put back in service. Pond D was filled with water to elevation El. 639.5 by the end of December 2007, and flow of water through the outlet pipes into Pond E began to occur. On January 30, 2008, the internal divider embankment D/E failed for a second time. The failure of the internal divider embankment D/E caused the north and west embankments of Pond E to be overtopped. Subsequently, the north embankment of Pond E breached resulting in a second uncontrolled release of 30 million gallons of water into the discharge canal. BT SQUARED attributed the second failure to the repair designed by Fuller, Mossbarger, Scott, and May Engineers (FMSM) in that they overestimated the shear strength of the flyash. BT SQUARED concluded the redesigned embankment cross-section by FMSM was inadequate to support the loading conditions in Pond D and Pond E.

BT SQUARED designed the second remedial design in 2008. The construction was ongoing at the time of the site visit. Construction is anticipated to be completed in the summer of 2010.

1.6 Site Geology

The site is located south of the White River. The area north of the discharge canal and the west impoundments are located within the 100-year floodplain. The ground surface around the impoundments ranges from approximately El. 605 to El. 613. Based on a review of available subsurface information and reports, the site is located within a glacial valley created by the erosion of the bedrock hills and the deposition of sand and gravel by glaciers and by the White River and Indian Creek. The subsurface conditions at the site generally consist of 1 to 14 feet of lean clay underlain by deposits of sand and gravel with variable amounts of clay down to bedrock. The bedrock in the vicinity of the site consists of soft shale at anticipated depths of approximately 100 to 120 feet below natural grade.

Section 2
Field Assessment
2.1 Visual Observations

CDM performed a visual assessment of the CCW impoundments at the EV Generating Station. The perimeter embankments of the impoundments total approximately 9,630 feet in length and are up to 38 feet high. The assessments were completed following the general procedures and considerations contained in Federal Emergency Management Agency's (FEMA's) Federal Guidelines for Dam Safety (April 2004) relative to observations concerning settlement, movement, erosion, seepage, leakage, cracking, and deterioration. A Coal Combustion Dam Inspection Checklist and CCW Impoundment Inspection Form, developed by USEPA, were completed on-site for each impoundment during the site visit. Copies of these forms are included in **Appendix A**. Photograph location plans are shown on **Figures 6a and 6b**, and photographs are included in **Appendix B.**

It should be noted tall vegetation in areas obscured visual observations of the exterior embankments. In particular, this is the case on the east and south exterior slope of Pond A and around the perimeter of Pond D and Pond E.

CDM visited the site on April 28 and April 29, 2010 to complete visual assessments of the impoundments. The weather was generally sunny with temperatures between approximately 60 and 75 degrees Fahrenheit. The daily total precipitation prior to the site visit is shown in **Table 1**.

Table 1 – Approximate Daily Total Precipitation Prior to Site Visit

Dates of Site Visits - April 28, 2010 & April 29, 2010		
Day	**Date**	**Precipitation (inches)**
Wednesday	April 21	0
Thursday	April 22	0
Friday	April 23	0
Saturday	April 24	0.08
Sunday	April 25	0.45
Monday	April 26	0.62
Tuesday	April 27	0
Wednesday	April 28	0
Thursday	April 29	0
Total	**Week Prior to Site Visit**	**1.15**
Total	**Month Prior to Site Visit**	**3.26**

Notes:

1. Precipitation data from www.weather.com.

2.2 Pond A

2.2.1 Exterior Slope

The exterior slopes of the Pond A embankments appear to be in fair condition. The exterior slopes on the north, south, east, and west embankments ranged from approximately 2.5H:1V to 3H:1V (Photos 1, 15, 20, 23, 25, 45, and 46). The exterior slope on the embankment between Pond A and Pond B (divider embankment A/B) and embankment between Pond A and Pond C (divider embankment A/C) ranged from approximately 2H:1V to 3H:1V (Photos 28, 33, 34, 38, 40, and 42).

The north, south, east, and west embankments were generally covered with grassy vegetation approximately 12 to 48 inches tall. There are multiple species of grass growing on the slope from the various expansions and erosion repairs. There was some small brush on the southwest embankment (Photo 23) and one bush growing on the east embankment.

On the east embankment there are some areas of sparse vegetation near the crest where the topsoil has a significant amount of gravel. There was also some minor surface erosion observed around the perimeter embankments.

One repair on the northeast corner of the east embankment was observed (Photos 1, 3, and 4). IPL indicated that the repair was needed due to an ash sluice line leak located in the northeast corner of Pond A. The repair consists of an erosion control blanket. The erosion control blanket did not appear to be installed consistent with typical manufacturer's recommendations. Stakes did not appear to be installed properly, and the blankets were not overlapped or keyed into an anchor trench in the slope. Approximately 1- to 3-inch gaps were observed below the blanket.

There were two low spots at the toe of the east embankment (Photo 5). At the low spots, there was also some minor sloughing. IPL stated these were low areas where a tractor had previously gotten stuck during mowing operations. A surface depression was also observed near the crest of the eastern embankment (Photo 7).

A possible former seep area was observed at the toe of the east embankment (Photo 12). IPL indicated that the conditions observed in this area were the result of an ash sluice line leak. A possible former seep was also observed in a soft spongy area along the toe of the south embankment (Photo 21). No active seepage was observed during the site visit. However, active seepage in these areas has been noted in previous inspection reports.

The exterior slopes on the divider embankments A/B and A/C were generally protected with riprap or crushed stone armor. Some areas were not armored and were covered with vegetative protection. Some erosion features, surface depressions, and minor sloughing were observed on the slope (Photos 32, 35, 36, 37, and 38). Some of the larger surface erosion areas appeared to have been recently filled with riprap or

stone (Photos 38, 40, 41, and 42). IPL indicated that the erosion was the result of heavy rainfall in the summer of 2008 and was repaired in June 2008. There was also some brush and small trees growing at the toe of the divider embankment in Pond C (Photo 42).

2.2.2 Crest

The crest of the Pond A embankments appeared to generally be in fair condition (Photos 2, 8, 14, 16, 19, 22, 24, 27, 30, 34, 43, and 44). The crest was approximately 15 feet wide with exception of the truck turn around area where the crest was significantly wider. The crest consists of a compacted gravel access road around the perimeter. Three low spots were observed in the crest (Photos 2, 14, and 28). Two of the low spots appear to be from recent truck traffic rutting the crest. The low spot on the east embankment observed on 4/28/10 was filled in by an IPL contractor to improve conditions for traffic purposes. IPL indicated that the low spot on the divider embankment near the outlet pipes (Photo 28) is an overflow spillway. There are no records in the information provided to CDM to indicate this was a design feature. There were no deficiencies observed in this area.

2.2.3 Interior Slope

The interior slope of the Pond A embankments was not visible along the north and east and majority of the west embankment due the presence of ash. The visible portions of the interior slope appeared to be generally armored with a layer of crushed stone and 3- to 4-inch stone. The visible portions of the interior slope were approximately 2H:1V. A heavier riprap layer is present around the outlet pipes (Photo 29).

2.2.4 Outlet Pipes

The outlet pipes in Pond A were in fair condition (Photos 28, 29, and 30). The T-connections at the inlets appear to be settling downward in most instances. The coupling at the connection between the T and the pipe may be starting to buckle from supporting the weight of the T based on observed sagging of the connection. The inlets were clean and a floating boom was wrapped around the inlets to reduce the potential for debris to clog the pipes.

2.3 Pond B

2.3.1 Exterior Slope

The exterior slopes of the Pond B embankments appear to be in fair condition. The exterior slope of the west embankments ranged from approximately 2.5H:1V to 3H:1V (Photos 59, 61 and 64).

The west embankment was generally covered with a grass approximately 12 to 48 inches tall. Riprap was recently placed on the exterior slope based on previous

inspection reports and IPL personnel. The riprap was placed on the exterior slope on November 4, 2009.

An erosion rill on the exterior slope at the southern reach of the west embankment was observed (Photo 65). The erosion rill had recently been filled with riprap to reduce further erosion. Another erosion rill was observed on the west embankment (Photo 26). Some crushed stone was placed near the crest of the embankment in an effort to reduce further erosion.

2.3.2 Crest

The crest of the Pond B embankments appeared to be generally in fair condition (Photos 31, 39, 57, 60 and 63). The crest was generally approximately 15 feet wide. The crest consists of a compacted gravel access road around the perimeter.

2.3.3 Interior Slope

The interior slope of the Pond B embankments appeared to be generally in fair condition (Photos 31, 39, 58, 60 and 62). The interior slopes were approximately 2H:1V. Riprap was placed on the interior slope on November 4, 2009 to repair significant erosion that had occurred based on information contained in previous inspection reports and discussions with IPL personnel. The extent of the erosion before placement of the riprap is unknown. IPL indicated that the erosion was the result of heavy rainfall in the summer of 2008 and was repaired in June 2008. Floating telephone poles that were previously used as the primary protection against wave action are still installed along the west embankment.

2.3.4 Outlet Pipes

The outlet pipes in Pond B were in fair condition (Photos 57, 58, and 59). The west outlet pipe is slightly lower than the east outlet pipe. No unusual movement was observed around the pipe penetrations.

2.4 Pond C

2.4.1 Exterior Slope

The exterior slopes of the Pond C embankments appear to be in fair condition. The exterior slopes on the north and west embankments were approximately 3H:1V (Photos 46, 50 and 53).The embankment was generally covered with grass approximately 12 to 48 inches tall. No erosion or other deficiencies were observed on the north and west embankments during the site visit.

2.4.2 Crest

The crest of the Pond C embankments appeared to be generally in fair condition (Photos 48, 52, and 56). The crest was generally approximately 15 feet wide. The crest consists of a compacted gravel access road around the perimeter.

2.4.3 Interior Slope

The interior slopes of the Pond C embankments appeared to be generally in fair condition (Photos 47, 49, 51, and 54). The interior slopes were approximately 2H:1V. Most of the north embankment has no erosion protection or armor. There is some riprap on the north embankment near the northeast corner and at the outlet structure. On the north embankment in the northeast corner there is an erosion rill developing (Photo 47). Fill and riprap was recently placed around outlet structure in the northwest corner (Photo 54) per previous inspection reports and IPL personnel.

On the west embankment there are large segments without erosion protection or armor. Eroded areas on the west embankment have been repaired with crushed stone and 3- to 4-inch stone. An erosion feature from the diversion boom rope was observed on the west embankment (Photo 55).

2.4.4 Outlet Structure

The outlet structure in Pond C was in fair condition (Photos 54 and 66). The inlet was free of debris, and water was flowing through the trash rack. The butterfly valve on the catwalk appeared to be maintained and could be turned with little effort. The outfall in the discharge canal appeared to be in fair condition. There was no visible erosion, and the pipe was not clogged.

2.5 Pond D

2.5.1 Exterior Slope

The exterior slopes of the Pond D embankments appear to be in fair condition with exception of the breached area. The exterior slopes on the north, south, east, and west embankments were approximately 3H:1V (Photos 67, 74, 75, 76, 83, 86, 89, 91, 97, 98, 131, 134, 135, 137, 143, 144, 145, and 146). The exterior slope on the embankment between Pond D and Pond E (divider embankment D/E) was approximately 3.5H:1V on the north embankment (Photos 99, 103, and 124) and approximately 3H:1V on the west embankment (Photos 122 and 125).

The north, south, east, and west embankment slopes were generally covered with grassy vegetation. The vegetation was approximately 12 to 48 inches tall. There are multiple species of grass growing on the slope from the various expansions and erosion repairs. Generally there are three distinct bands from the expansions (Photo 9). The vegetation on the upper third of the slope generally was shorter, and there were multiple areas of sparse vegetation (Photos 80, 81, 84, 85, 89, 97, 122, and 125). The topsoil layer on the upper third of the slope had a significant amount of sand and gravel and was loose in nature. Multiple surficial erosion features were observed on the upper portion of the embankment around the perimeter of the impoundment (Photos 72, 73, 82, and 90). A riprap layer was observed at approximately El. 625, consistent with the first crest elevation. The riprap layer was observed on the east, south, and west perimeter embankments.

The upper portion of the north and west divider embankment D/E had a vegetative cover. On the north divider embankment at approximately El. 630 there was a 19-foot-wide by 5-foot-high buttress berm. The buttress berm was covered with riprap over a filter fabric (Photo 99 and 103). Washout from the breach and excavated material from the repair work was observed on the riprap. The divider embankment was in the process of being repaired, with repairs initiated on April 21, 2010.

2.5.2 Crest

The crest of the Pond D embankments appeared to be generally in fair condition (Photos 68, 69, 77, 84, 87, 92, 100, 121, 132, 138, and 142). The crest was generally approximately 20 feet wide. The crest consists of a compacted gravel access road around the perimeter. Some tire rutting was observed from the recent truck traffic.

Five piezometers were installed on the crest of Pond D by BT SQUARED between June 11, 2008 and June 13, 2008. The well covers for three of the piezometers were observed (Photo 78).

2.5.3 Interior Slope

The interior slope of the Pond D embankments appeared to be generally in fair condition with exception of the breached area (Photos 69, 79, 88, 92, 93, 94, 95, 96, 101, 139, and 141). The interior slope generally was 3H:1V slope where visible. Slope armor on the north, east, and south embankment appeared to be a layer of crushed stone and/or shale. The interior slope on divider embankment D/E was armored with riprap over a filter fabric on approximately the upper 6 feet.

Some erosion rills were observed on the interior slope of divider embankment D/E (Photo 93 and 94). IPL indicated that the erosion rills were in the process of being repaired with scheduled completion by the end of fall in 2010.

2.5.4 Divider Embankment

The divider embankment appeared to be in fair condition. The crest consisted of an approximately 20-foot-wide crushed stone access road with weeds growing at the end of the embankment (Photos 129). The east and west slope of the embankment was generally 3H:1V. Riprap was observed on approximately the upper six feet (Photos 95 and 102) of the embankment. Two erosion features were observed on the divider embankment (Photos 126 and 127). A surface depression with potential minor piping activity was observed at the crest on the east slope (Photo 130).

2.5.5 Breached Section and Remedial Construction

The remedial construction of the breached portion of divider embankment D/E was observed during the site visit. The breached section has been cut back at approximately a 3H:1V slope (Photos 94, 102, 118, 122, and 124). The outlet pipes from the divider embankment were observed (Photo 125). The pipes appear to be in satisfactory condition. The replacement piping and anti-seepage collars for the repair

work were also observed (Photo 71). Portions of the concrete anti-seepage collar from the 2007 repair were also observed on the crest of divider embankment D/E (Photo 118). The remaining sections of the embankment appeared to be in fair condition.

2.5.6 Toe Drain

A toe drain along the north embankment exterior toe was observed during the site visit (Photo 134). The toe drain discharges into a sump pit located northeast of Pond D (Photo 70). The outlet was underwater and no flow was observed from the toe drain.

2.6 Pond E

2.6.1 Exterior Slope

The exterior slopes of the Pond E embankments appear to be in poor condition. The exterior slopes on the north and west embankments were approximately 3H:1V (Photos 105, 111 and 114).The embankment was generally covered with a grass approximately 12 to 48 inches tall. There were significant erosion features on the west and north embankment exterior slope from the overtopping on January 30, 2008 (Photos 106, 107, 112, 113, and 119). IPL indicated that the erosion features were in process of being repaired with a target completion date by the end of fall 2010.

2.6.2 Crest

The crest of the Pond E embankments appeared to be generally in fair condition (Photos 110, 116, and 120). The crest was generally approximately 20 feet wide. The crest consists of a compacted gravel access road around the perimeter.

2.6.3 Interior Slope

The interior slopes of the Pond E embankments appeared to be generally in fair condition with exception to the breach area (Photos 103, 104, 109, 116, and 120). The interior slopes were approximately 3H:1V. Approximately the top 6 feet of the interior slope had erosion protection consisting of riprap. Compacted ash was being backfilled against the interior slope as part of the repair work (Photos 103, 104, 116, 117, and 120).

2.6.4 Breached Section and Remedial Construction

The remedial construction of the breached portion of the north embankment was observed during the site visit. The breached section has been cut back at approximately a 3H:1V slope (Photos 104, 114, 116, 117, 118, 120). Ash was being excavated from Pond A (Photos 8, 11, and 16) and was being placed as compacted fill. Five tri-axle dump trucks were transporting the ash from Pond A to Pond E. A Caterpillar B85 track dozer was being used to spread the ash and a Caterpillar vibratory soil compactor was being used to compact the lifts of ash. A field representative from BT SQUARED was onsite to perform field density and moisture content testing of the compacted ash backfill.

2.6.5 Outlet Structure

The outlet structure in Pond E was in fair condition (Photos 104 and 115). The inlet was free of debris and stoplogs were in place. The butterfly valve on the catwalk appeared to be maintained and could be turned with little effort. The discharge pipeline manholes from Pond E to Pond C appeared to be in fair condition (Photo 108). Water was not coming out of the outlet in Pond C.

Section 3
Data Evaluation

3.1 Design Assumptions

CDM was not provided with any of the original IPL design assumptions for the CCW impoundments. IPL provided some design documents related to the first and second repairs of Pond D and Pond E. CDM has reviewed the available information related to the design and analysis of Ponds D and E. The design assumptions are discussed in the following sections.

3.2 Hydrologic and Hydraulic Design

CDM was not provided with any hydrologic and hydraulic designs and analyses for the five impoundments.

CDM performed a preliminary evaluation of the hydraulic capacity of the impoundments to estimate if the ponds are adequately sized to store or pass the design storm event. Based on "General Guidelines for New Dams and Improvements to Existing Dams in Indiana", IDNR (February 2010), the Probable Maximum Precipitation (PMP) for a 6-hour storm event over a 10 square-mile area in the vicinity of the site is approximately 27.3 inches. IDNR requires significant and high hazard structures to pass 50% PMP and 100% PMP, respectively. The drainage area contributing to the ponds at this site is limited to the storage area within the impoundments. Preliminary evaluations indicate that there is enough storage capacity and freeboard in Ponds A, B, C, and E at the current operating pools to safely store a 50% PMP event without being overtopped. Preliminary evaluation of Pond D indicates that there is enough storage capacity and freeboard at the current operating pool to safely store a PMP event without being overtopped.

3.3 Structural Adequacy & Stability

The IDNR requires new and existing structures be evaluated under standard design guidelines. Procedures established by the United States Army Corps of Engineers (USACE), the United States Bureau of Reclamation, the Federal Energy Regulatory Commission, and the United States Natural Resources Conservation Service are generally accepted engineering practice. Minimum required factors of safety outlined by the USACE in EM 1110-2-1902, Table 3-1 and seismic factors of safety by FEMA Federal Guidelines for Dam Safety, Earthquake Analyses and Design of Dams (pgs. 31, 32 and 38, May 2005) are provided in **Table 2**.

Table 2 - Minimum Required Factors of Safety

Load Case	Minimum Required Factor of Safety
Steady-State Condition at Normal Pool or Maximum Storage Pool Elevation	1.5
Rapid Drawdown Condition from Normal Pool Elevation	1.2
Maximum Surcharge Pool (Flood) Condition	1.4
Seismic Condition at Normal Pool Elevation	1.0
Liquefaction	1.3

3.3.1 Pond A, Pond B and Pond C

CDM was not provided with any information regarding the structural adequacy and stability of Ponds A, B, and C. CDM was not able to perform stability analyses for the embankments because CDM was not provided with any information relative to the properties of the foundation and embankment materials.

3.3.2 Pond D and Pond E

After the first failure in 2007, IPL retained BBCM Engineers to evaluate the embankments. BBCM performed four test borings in the vicinity of the breach in February 2007. IPL later retained FMSM. FMSM performed five additional borings in the vicinity of the breach in May 2007. FMSM performed laboratory testing on representative samples recovered from the test borings. Laboratory testing included:

- Moisture Content;
- Sieve and Hydrometer Analysis;
- Atterberg Limits;
- Standard Proctor Moisture-Density Tests;
- Unconfined Compressive Strength Tests; and
- Consolidated Undrained Triaxial Shear Strength Tests.

FMSM performed slope stability analyses to evaluate the stability of the existing embankment in the vicinity of the failures and proposed repairs. A summary of the soil parameters used in the analyses is presented in **Table 3** below. FMSM evaluated the stability of divider embankment D/E under long-term normal pool and rapid drawdown conditions. Based on FMSM's analyses the factor of safety (FS) against slope failure for the existing embankment cross-section was 1.0 and 0.8 for long-term normal pool and rapid drawdown conditions, respectively. FMSM also evaluated the stability of embankment repairs. FMSM proposed a repair consisting of a 5-foot-thick granular buttress berm with a bench at El. 630, as shown on **Figure 7**. Based on FMSM's analyses, the FS against slope failure for the repaired embankment cross-

section was 1.5 and 1.4 for long-term normal pool and rapid drawdown conditions, respectively. No other stability analyses were performed for the impoundment.

Table 3 – FMSM – Pond D & E Soil Parameters

Stratum	Unit Weight (pcf)	Friction Angle (°)	Cohesion (psf)
Flyash	90	33	--
Clay	125	25	50
Sand and Gravel	120	31	--

After the second failure in 2008, IPL retained BT SQUARED, Inc., to investigate the cause for the two failures in Ponds D and E. BT SQUARED performed seven additional borings around the impoundments in June 2008. BT SQUARED performed laboratory testing on representative samples recovered from the test borings. Laboratory testing included:

- Moisture Content;
- Sieve and Hydrometer Analysis;
- Atterberg Limits; and
- Hydraulic Conductivity.

BT SQUARED performed slope stability analyses to evaluate the stability of the original cross section, FMSM's remedial design, and proposed repairs. BT SQUARED first back calculated the shear strength of the flyash using FMSM's design to obtain a FS=1.0. A summary of the soil parameters used in the analyses are presented in **Table 4** below. After estimating the shear strength of the flyash, BT SQUARED evaluated the stability of divider embankment D/E under long-term normal pool conditions. Based on BT SQUARED analyses, the FS against slope failure for the FMSM embankment repair was 0.91 to 0.96. BT SQUARED evaluated multiple remedial improvements under long-term normal pool elevation. Based on BT SQUARED analyses, the FS against slope failure for their conceptual embankment improvement, shown on **Figure 8**, was 1.95. BT SQUARED also evaluated the stability of Pond E's north embankment. Based on BT SQUARED analyses, the FS against slope failure was 0.87. In addition, BT SQUARED evaluated the stability of the Pond E embankment with a lower water level at El. 620 and a buttress berm on the exterior slope. Based on BT SQUARED analyses, the long-term FS against slope failure was FS=1.57. No other stability analyses were performed for Pond D or Pond E.

Table 4 – BT SQUARED **– Pond D & E Soil Parameters**

Stratum	Unit Weight (pcf)	Friction Angle (°)	Cohesion (psf)
Flyash	90	21	--
Clay	125	25	50
Sand and Gravel	120	31	--
Toe Drain	140	35	--

3.4 Foundation Conditions

CDM was not provided with information to evaluate if Pond A, Pond B or Pond C were constructed on wet ash, slag or other unsuitable materials.

Documents reviewed by CDM indicate that Pond D and Pond E embankments appear to have been constructed on moist to wet, very soft to soft flyash with moisture content ranging 11.2%to 79%. In general, it appears that below the flyash soft to stiff, lean clay underlain by medium dense sand and gravel with variable amounts of clay was present. Shale bedrock is anticipated at depths of approximately 100 to 120 feet based on our review of the literature. The moisture content of two clay samples at test borings B-5 and B-6 were at or greater than the liquid limit.

CDM was not provided with documentation of foundation preparation for the vertical expansions of Pond D and Pond E. However organics, concrete, wood, and silty clay were encountered in the test borings performed by BT SQUARED, which may have been present at the foundation of the vertical expansions.

3.5 Operations and Maintenance

IPL personnel indicated that there is no written formal operation or maintenance program. They also do not have an emergency action plan. Routine maintenance performed includes mowing grass on embankment slopes once per year, and other activities as needed to address other observed conditions such as erosion and revegetation. IPL personnel also indicated water levels are not monitored in the impoundments.

In addition, EV Generating Station personnel perform visual inspections of the impoundments every two weeks. Plant personnel were trained by BT SQUARED to perform the visual inspections. A copy of the typical inspection checklist is provided in **Figure 9**. As issues are observed, work orders are placed at the plant for identified deficiencies to be repaired. Additional observations are completed after significant storm events. These additional observations are not documented. Since 2008, semi-annual detailed visual inspections have also performed at the EV Generating Station by BT SQUARED. Inspection reports, with conclusions and recommendations, are prepared and submitted to IPL.

Section 4
Conclusions/Recommendations

4.1 Hazard Classification

The EV Generating Station impoundments currently do not have an IDNR- developed Hazard Potential Classification. Based on the USEPA classification system as presented on page 2 of the USEPA check list (**Appendix A**) and our review of the site and downstream areas, recommended hazard ratings have been assigned to the impoundments as summarized in **Table 5** below:

Table 5 – Recommended Impoundment Hazard Classification Ratings

Impoundment	Recommended Hazard Rating	Basis
Pond A	Significant Hazard	• A breach could damage the railroad. • A breach could damage a transmission tower. • A breach could result in the failure of Pond B or Pond C. • A breach would have an environmental impact on the White River, Discharge Canal, and downstream area.
Pond B	Significant Hazard	• A breach could result in the failure of Pond A or Pond C. • A breach would have an environmental impact on the White River, Discharge Canal, and downstream area.
Pond C	Significant Hazard	• A breach could result in the failure of Pond A or Pond B. • A breach would have an environmental impact on the White River, Discharge Canal, and downstream area.
Pond D	High Hazard	• A breach could result in the failure of Pond E. • A breach would have an environmental impact on the White River, Discharge Canal, and downstream area. • A breach could damage a transmission tower. • A breach could damage the railroad. • Considering that the east portion of the pond may be utilized to store ash slurry in the future, a breach of the east embankment, for which no slope stability analyses has been completed, will probably cause loss of life at the plant due to the close proximity of the plant to the east embankment.
Pond E	Significant Hazard	• A breach could result in the failure of Pond D. • A breach would have an environmental impact on the White River, Discharge Canal, and downstream area. • A breach could damage the railroad.

4.2 Acknowledgement of CCW Impoundment Condition

CDM acknowledges that the management units (Pond A, Pond B, Pond C, Pond D, and Pond E) referenced herein were assessed by Michael L. Schumaker, P.E. and Michael P. Smith. Ponds A, B, and C appeared to be in FAIR condition based on site observations. However, there is a lack of documentation relative to the design and construction of these facilities as identified in Section 3 of this report. It is not known if critical studies or investigations (stability, hydrologic, hydraulic, seismic) have been performed to confirm that potential safety deficiencies do not exist. Therefore, despite the FAIR condition assessment based on field observations, Ponds A, B, and C are judged to be in **POOR** condition based on the lack of design documentation. Additional documentation and future studies performed to confirm the condition and performance of these impoundments may be sufficient to substantiate an improved condition assessment. Ponds D and E were also judged to be in **POOR** condition**.** An assessment of POOR for these ponds is due to incomplete breach repairs and the need for additional studies or investigations, such as confirmation of availability of sufficient storage capacity and additional slope stability analyses, to confirm that other potential safety deficiencies do not exist.

As described in the following sections, further studies, maintenance and monitoring may further improve the condition of these impoundments.

4.3 Maintaining and Controlling Vegetation Growth

Tall vegetation in areas obscured visual observations of the exterior embankments. In particular, this is the case on the east and south exterior slope of Pond A and around the perimeter of Pond D and Pond E. There was also some brush and small trees growing at the toe of the Pond A divider embankment in Pond C. Typical practice is to remove 4-inch-diameter and larger woody growth. On impoundments with either standing water or high piezometric levels within the deposited ash, tree roots can concentrate seepage of water through the embankments, which could lead to internal erosion. Internal erosion would weaken the embankment, reduce stability, and could result in a slope failure and potential release of stored water and ash.

CDM recommends that vegetation be cut on a regular basis to ensure that adequate visual observations can be made by IPL's personnel during routine inspections and by the independent consultant during their semi-annual inspection.

4.4 Erosion Protection and Repair

Erosion rills and loss of ground cover were observed on multiple embankment slopes of Ponds A through E as discussed in **Section 2**. Thinning and loss of grass cover due to concentrated flow was noted on some embankment slopes. CDM recommends filling all rills and re-seeding these areas. Large erosion features were noted on the west exterior slope of Pond E from the 2008 overtopping. The erosion features are scheduled to be backfilled as part of the remedial work.

4.5 Impoundment Hydraulic and Stability Analysis

IPL did not provide CDM with a hydraulic analysis showing the ability of the impoundments to safely pass the 50% or 100% PMP event. However, a preliminary evaluation performed by CDM suggests there is enough storage capacity at the current operating pool levels to safely store precipitation from this rainfall event. CDM recommends IPL perform a complete study to confirm this conclusion, and update the study if operating levels of the pond change in the future.

CDM was not provided with information regarding stability analyses performed prior to or following construction of Pond A, Pond B, or Pond C or information regarding properties of the embankment and foundation materials. It is recommended that detailed stability analyses be performed for Pond A, Pond B, Pond C, and Pond E east embankments. The stability analyses for each pond should include a subsurface investigation to evaluate existing soil parameters in the embankments and foundation soils and the installation of piezometers to measure the current phreatic surface. Stability analyses should consider all appropriate operating and loading conditions including rapid drawdown if applicable, and seismic events.

BT SQUARED performed stability analyses for Pond D and Pond E which indicated that the embankment was marginally stable and remedial work was required. The stability analyses did not consider other potential critical cross-sections, such as the south or east embankments, or loading conditions for maximum surcharge pool (flood), seismic or rapid drawdown conditions. CDM recommends that other critical cross-sections and loading conditions be evaluated relative to slope stability for these impoundments.

CDM recommends that all analyses be performed by a registered professional engineer experienced in earthen dam design.

4.6 Remedial Design

The remedial design by BT SQUARED includes the installation of a 30-inch-diameter HDPE pipe with 8-foot square HDPE anti-seep collars at 50-feet on center through the compacted ash in Pond E. The use of filter diaphragms to control potential seepage along pipes is preferred in lieu of anti-seep collars. This is due to potential construction difficulties associated with proper placement and compaction of fill materials in the vicinity of the anti-seep collars, which can render the collars ineffective. However, properly installed anti-seep collars are an acceptable means to control seepage.

4.7 Inspection Recommendations

Based on the information reviewed by CDM it does not appear that IPL has adequate inspection practices. Currently inspection documentation prepared by plant personnel consist of limited checklists completed every two weeks for all five ponds to document the presence of any failures, erosion, vegetative cover in a "yes" or "no" format and to document operation conditions such as work activities. The inspection checklists are inadequate to document specific potential items that need to be addressed and the area where they are located. CDM recommends that plant personnel develop more-detailed inspection documentation procedures to aid in ensuring that they are performing adequate inspections and adequately documenting observations over time. Documentation should include a sketch of relevant features observed, and the documentation should be periodically reviewed to identify if conditions are worsening and/or if significant changes are occurring which could lead to additional maintenance issues or safety concerns.

Inspection procedures should include the recording of data from existing piezometers on Pond D and Pond E. A staff gage should be installed at outlet structures to record water levels in the impoundments, if applicable. In addition, inspections should be made following heavy rainfall and/or high water events on the White River, and the occurrence of these events should be documented. It is recommended that inspection records be retained at the facility for a minimum of three years.

Section 5
Closing

The information presented in this report is based on visual field observations and review of reports and data provided to CDM by IPL for the Eagle Valley Generating Station surface impoundments. The conclusions and recommendations presented are based, in part, on limited information available at the time of this report. This report has been prepared in accordance with generally accepted engineering practices. No other warranty, expressed or implied, is made. Should additional information become available or changes in field conditions occur, the conclusions and recommendations provided in this report should be re-evaluated by a qualified professional engineer.

Section 6
Reports and References

The following is a list of reports and drawings that were provided by Indianapolis Power and Light Company and were utilized during the preparation of this report and the development of the conclusions and recommendations presented herein.

1. Drawing No. 007-00-6-a-d-16b, "General Plan, Sheet No. 1, Units No. 1 & 2", prepared by Gibbs & Hill, Inc., March 7, 1947

2. Drawing No. 007-00-6-a-d-16a, "General Plot Plan", prepared by Indianapolis Power and Light Company, September 23, 1953

3. Drawing No. 007-00-6-y-d-g42, "New Ash Disposal Area Miscellaneous Details", prepared by Indianapolis Power and Light Company, May 5, 1981

4. Drawing No. 007-00-6-y-d-42J, "Abandon Ash Pond & New Decant Structure Area Plan", prepared by Indianapolis Power and Light Company, April 8, 1982

5. Drawing No. 007-00-6-y-d-42a, "Revised Ash Disposal Area", prepared by Indianapolis Power and Light Company, May 5, 1981, Revised May 1990

6. USGS Martinsville Quadrangle, prepared by USGS, 1998

7. Drawing, "Pond "D"", prepared by Indianapolis Power and Light Company, 2002

8. Drawing No. 006-00-6-y-d-xx, "Pond D Levee Additions", prepared by Indianapolis Power and Light Company, September 7, 2004

9. Drawing Sheet 1 of 1, "Eagle Valley Plant Ash Pond Final Asbuilt", Trans Ash, May 24, 2005

10. Plans for Construction, Remedial Drawings – 1st Repair, prepared by FSMS Engineers, August 10, 2007

11. 2008 Dike Inspection, prepared by Geosyntec Consultants, September 5,2008

12. Causal Analysis Report – Eagle Valley Generating Plant, prepared by BT SQUARED, October, 2008

13. Feasibility Analysis for Use of D-Pond for Future Processing of Ash Slurry, prepared by BT SQUARED, December 18, 2008

14. Response to U.S. EPA 104(e) Information Request, prepared by Indianapolis Power & Light Company, May 13, 2009

15. Eagle Valley Generating Station Site Plan, prepared by Keramida, July 9, 2009

16. 2009 Dike Inspection, prepared by BT SQUARED, August 7, 2009

17. Plans for Construction, Remedial Drawings – 2nd Repair, prepared by BT SQUARED, September 24, 2009

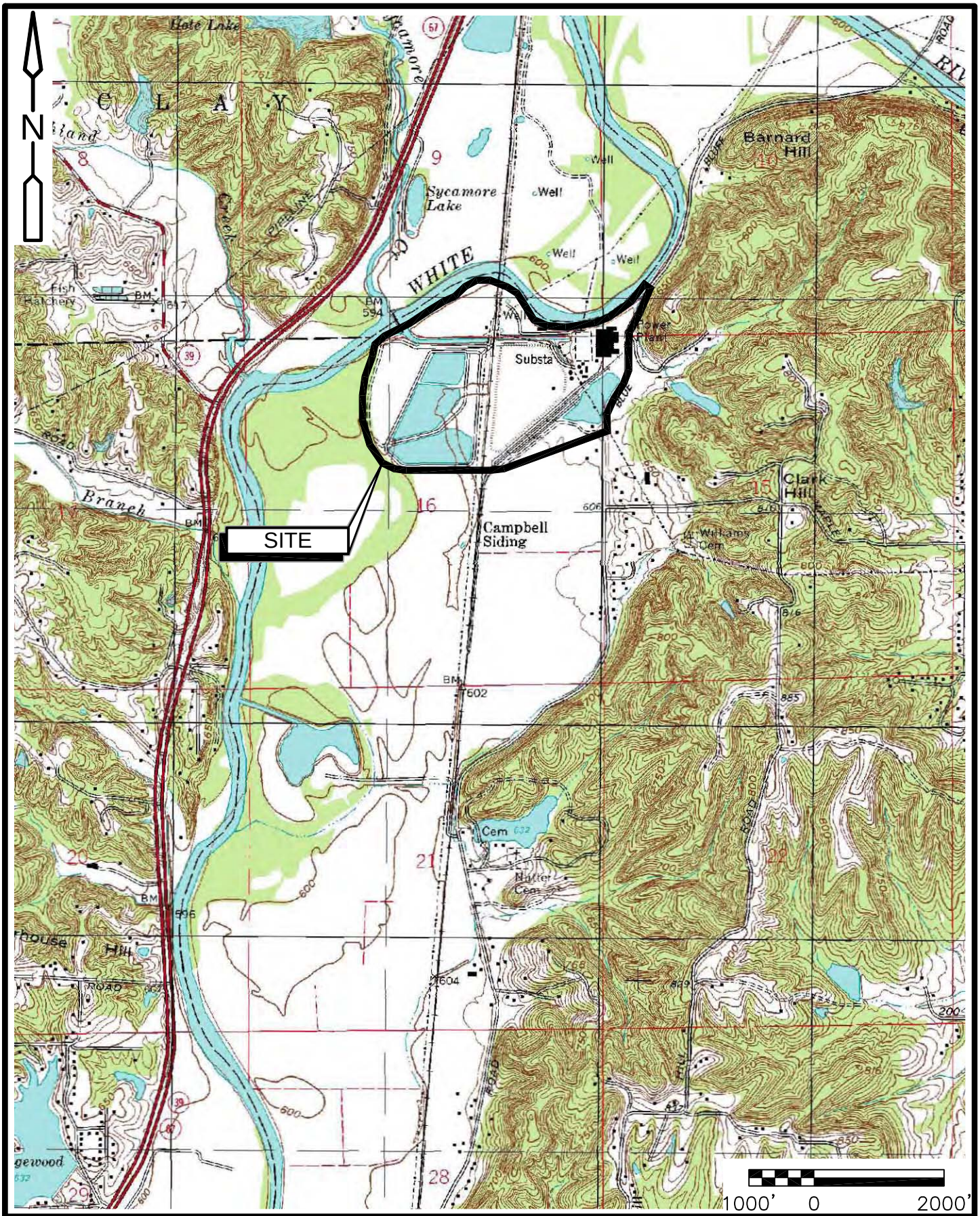
18. 2009-2 Dike Inspection – Eagle Valley Generating Station, prepared by BT SQUARED, April 5, 2010

19. Bi-Weekly Ash Pond Inspections Record, prepared by BT SQUARED, from January 12, 2009, to April 19, 2010

20. Visual Inspections of Ash Pond Levees, prepared by Indianapolis Power & Light, from August, 2007, to March, 2010

21. General Guidelines for New Dams and Improvements to Existing Dams in Indiana, IDNR, February 2010

Figures



USGS TOPOGRAPHIC MAPS
MARTINSVILLE QUADRANGLE MAP
CONTOURS AND ELEVATIONS IN FEET

CITY OF MARTINSVILLE, INDIANA

EAGLE VALLEY GENERATING STATION

INDIANAPOLIS POWER & LIGHT COMPANY

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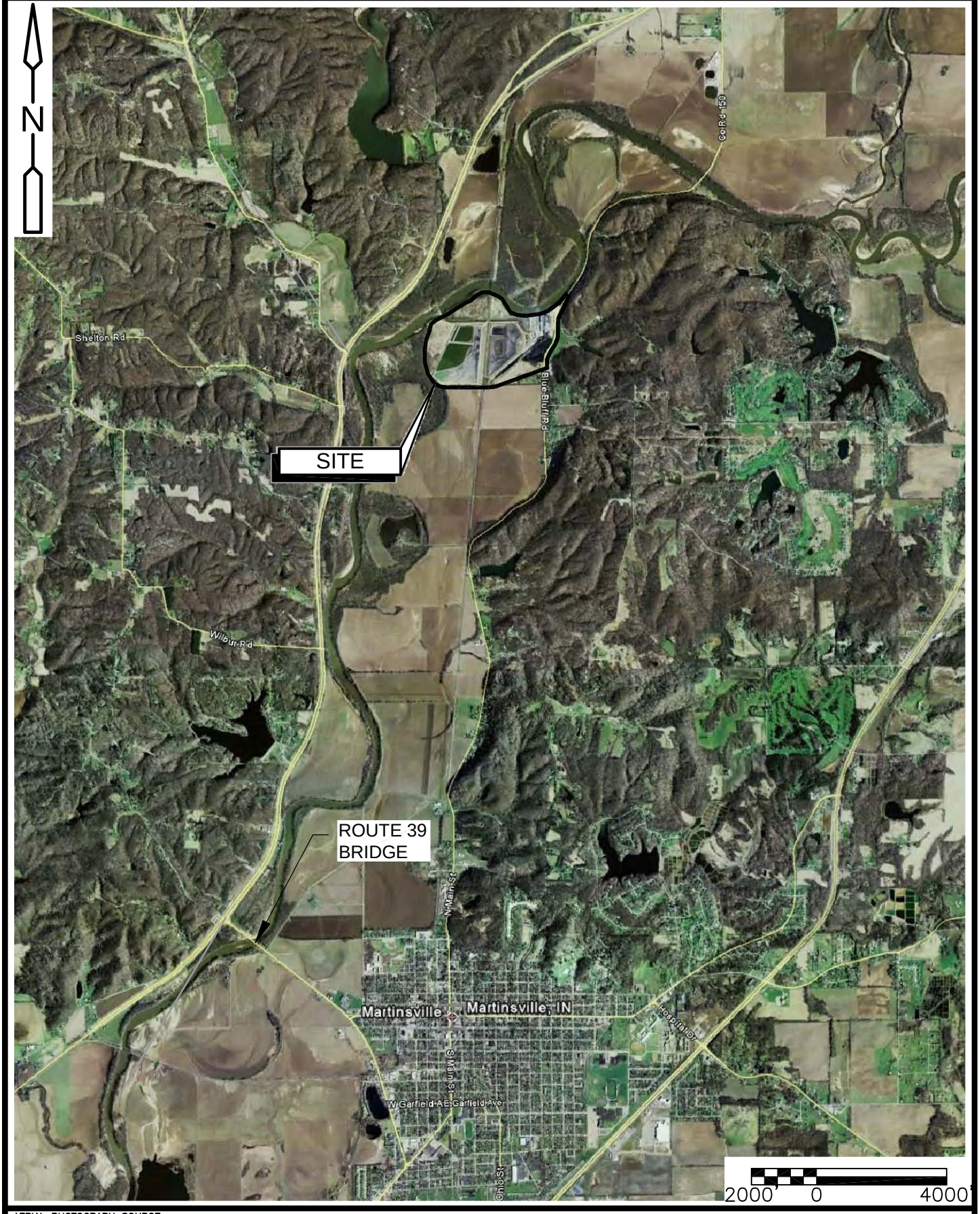
LOCUS PLAN

MAY 2010

FIGURE 1

PW:\\camxmsvr01:PW_XM1\Documents\51119\76658_Eagle_Valley\03 Reports and Studies\09 CADD Figures and Graphics\TLMFG001.dwg



AERIAL PHOTOGRAPH SOURCE:
GOOGLE EARTH PRO.

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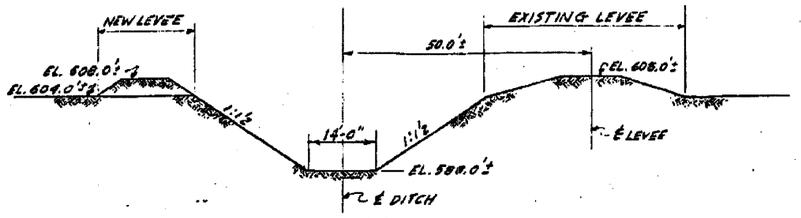
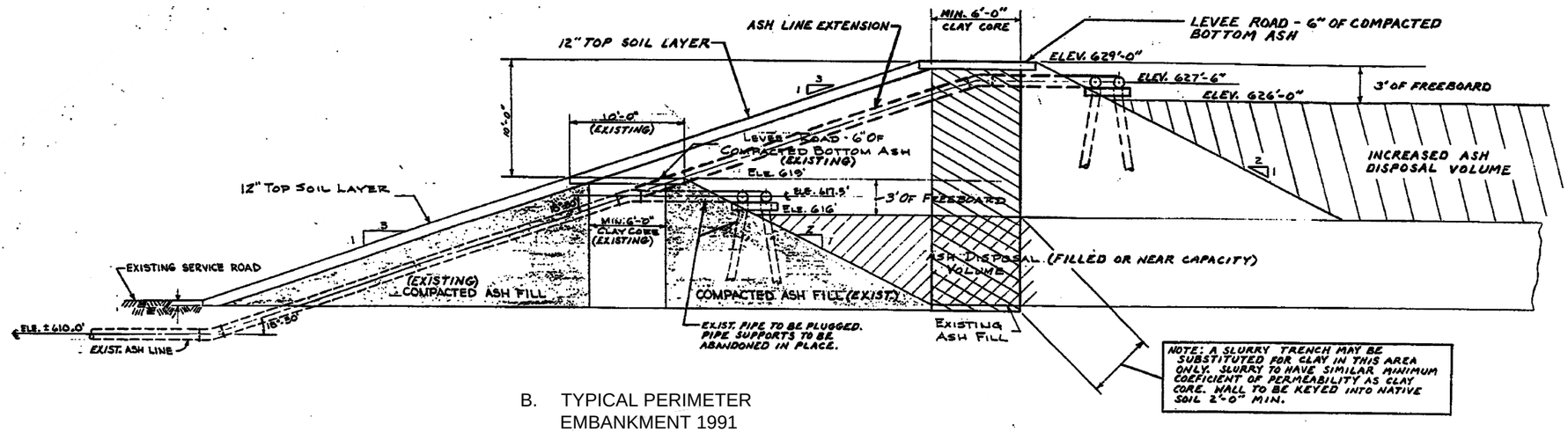
CRITICAL INFRASTRUCTURE MAP

MAY 2010 FIGURE 2

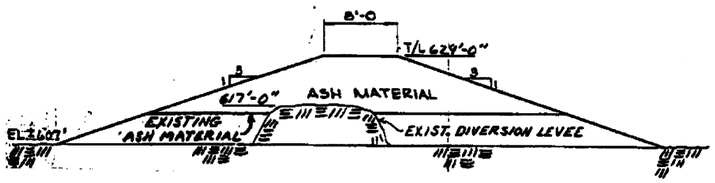
PW:\\camxmsvr01:PW_XM1\Documents\51119\76658_Eagle_Valley\03 Reports and Studies\09 CADD Figures and Graphics\TDSFG002.dwg



A. TYPICAL PERIMETER EMBANKMENT 1949



B. TYPICAL PERIMETER EMBANKMENT 1991



C. TYPICAL DIVIDER EMBANKMENT BETWEEN POND A AND POND B & C

NOTES:

1. TYPICAL CROSS-SECTION A FROM IPL DRAWING N#007-00-6-A-D-16B.
2. TYPICAL CROSS-SECTION B FROM IPL DRAWING N#007-00-6-Y-D-42G
3. TYPICAL CROSS-SECTION C FROM DRAWING N#007-00-6-Y-D-42A

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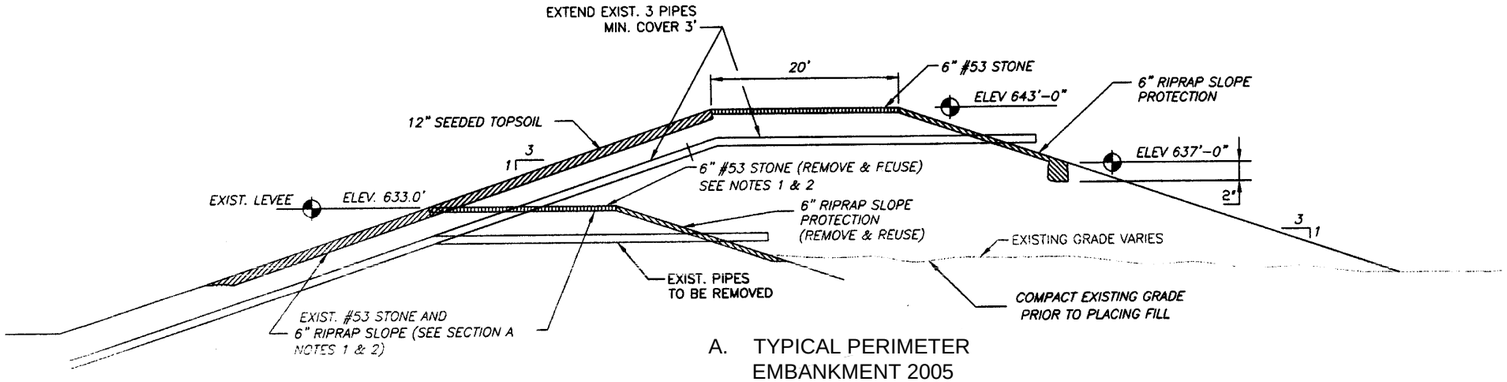
TYPICAL CROSS-SECTIONS POND, A, B & C
FIGURE 3



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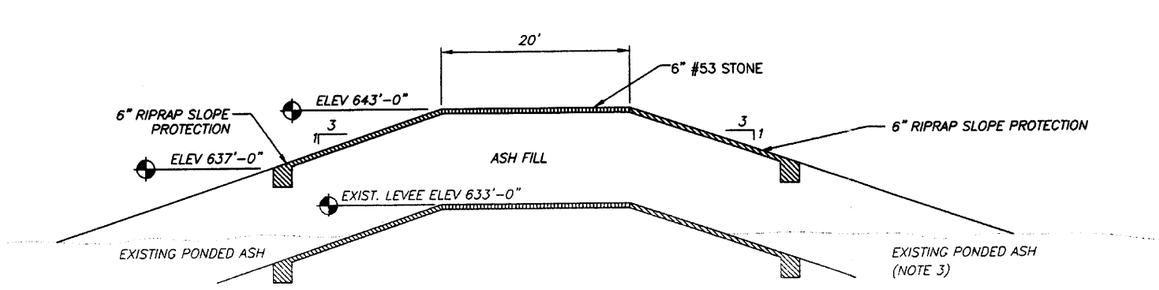
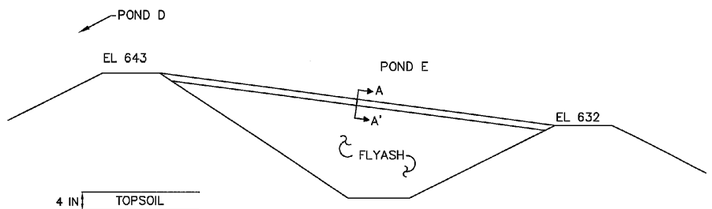
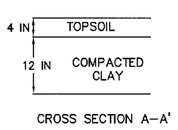


B. TYPICAL WEST DIVIDER EMBANKMENT D/E AND POND D DIVERSION EMBANKMENT 2005





CROSS SECTION A–A'

CROSS SECTION X–X'

C. PROPOSED TYPICAL CROSS-SECTION POND E

NOTES:

1. TYPICAL CROSS–SECTION A & B FROM IPL DRAWING 006–00–6–4–D–XX.
2. TYPICAL CROSS–SECTION C FROM BT^2 FIGURE 9, APRIL 14, 2010

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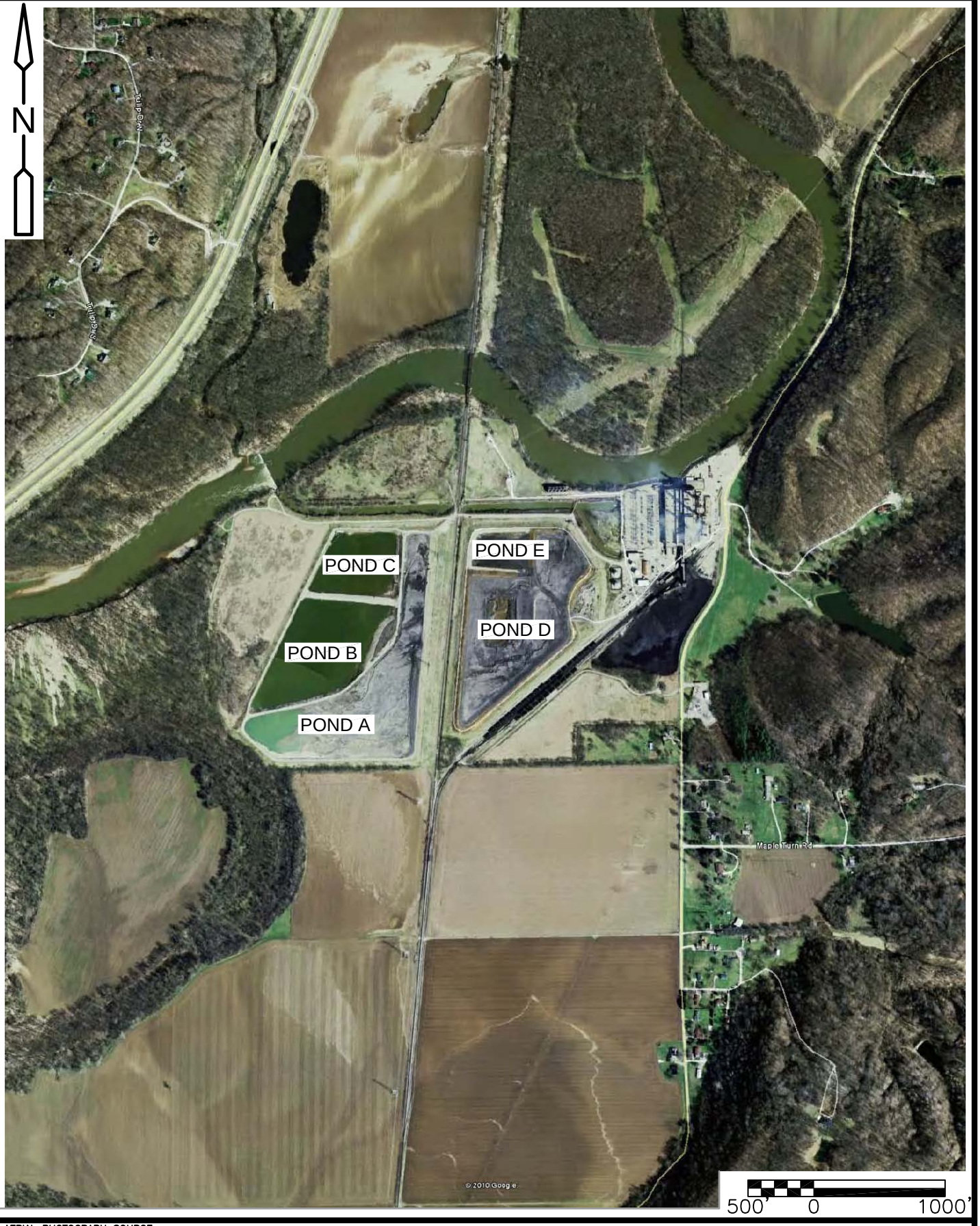
TYPICAL CROSS-SECTIONS POND, D & E
FIGURE 4

PW:\\comxmsvr01:PW_XM1\Documents\51119\76658_Eagle_Valley\03 Reports and Studies\09 CADD Figures and Graphics\TCSFG004.dwg



AERIAL PHOTOGRAPH SOURCE:
GOOGLE EARTH PRO.

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AERIAL MAP

MAY 2010

FIGURE 5

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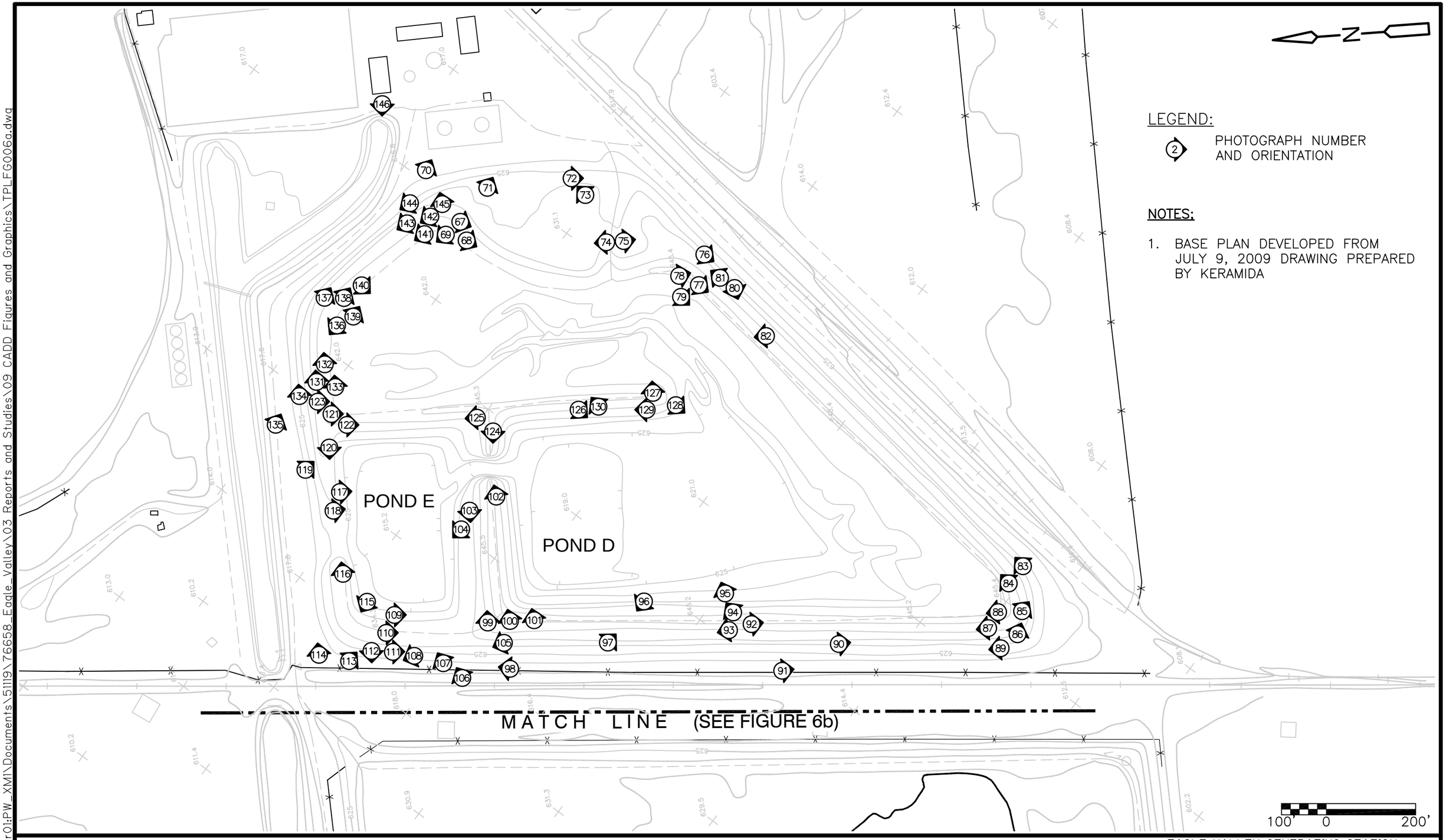

LEGEND:

2 PHOTOGRAPH NUMBER AND ORIENTATION

NOTES:

1. BASE PLAN DEVELOPED FROM JULY 9, 2009 DRAWING PREPARED BY KERAMIDA

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PHOTOGRAPH LOCATION PLAN
FIGURE 6a

PW:\\camxmsvr01:PW_XM1\Documents\51119_76658_Eagle_Valley\03 Reports and Studies\09 CADD Figures and Graphics\TPLFG006a.dwg

MATCH LINE (SEE FIGURE 6a)

POND C

POND B

POND A

LEGEND:

(2) PHOTOGRAPH NUMBER AND ORIENTATION

NOTES:

1. BASE PLAN DEVELOPED FROM JULY 9, 2009 DRAWING PREPARED BY KERAMIDA

100' 0 200'

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PHOTOGRAPH LOCATION PLAN

FIGURE 6b

PW:\\camxmsvr01:PW_XM1\Documents\51119\76658_Eagle_Valley\03 Reports and Studies\09 CADD Figures and Graphics\TPLFG006b.dwg

EAGLE VALLEY
BI-WEEKLY ASH PONDS INSPECTIONS RECORD

This record is completed on a bi-weekly basis after inspection is completed.

DATE: 4-19-10

Ash Pond Description (Name/ID)	Date	Erosion Along Crest or Embankment Slopes (Y/N)	Appearance of Sinkholes or Failure (Y/N)	Tension Cracks Along Crest or Slope Faces (Y/N)	Presence of Vegetation Cover Along the Embankment Slopes (Y/N)	Changes in Dike Alignment (Y/N)	Appearance of Erosion/Deterioration Around Outlet Structures (Y/N)	Description of Current Operational Conditions (Normal/ Abnormal)	Initials: Authorized Supervisor	Initials: Personnel
A	4-19-10	N	N	N	Y	N	N	N	JKA	JKA
B	4-19-10	N	N	N	Y	N	N	N	JKA	JKA
C	4-19-10	N	N	N	Y	N	N	N	JKA	JKA
D	4-19-10	B/S	BREACH @ DE LEVEE						JKA	JKA
E	4-19-10	B/S	BREACH @ DE LEVEE & N FACE OF E (REPAIRED 2-9-09)						JKA	JKA
			* PREP WORK STARTED FOR REPAIR OF "E" POND							
			TO START ON 4-21-10							

IPL INSPECTION CHECKLIST

CITY OF MARTINSVILLE, INDIANA
EAGLE VALLEY GENERATING STATION
INDIANAPOLIS POWER & LIGHT COMPANY

CDM
consulting • engineering • construction • operations

TYPICAL BI-WEEKLY INSPECTION CHECKLIST
MAY 2010 FIGURE 9

PW:\\camxmsvr01:PW_XMI\Documents\51119\76658_Eagle_Valley\03 Reports and Studies\09 CADD Figures and Graphics\TDTFG009.dwg

Appendix A
USEPA Coal Combustion Dam Inspection Checklist Forms

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	IPL Eagle Valley Generating Station	Date:	April 28, 2010
Unit Name:	Pond A	Operator's Name:	Indianapolis Power & Light Company
Unit I.D.:	n/a	Hazard Potential Classification:	High (Significant) Low
Inspector's Name:	Michael Smith, Michael Schumaker		

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	see note 1		18. Sloughing or bulging on slopes?	x	
2. Pool elevation (operator records)?	626.0		19. Major erosion or slope deterioration?		x
3. Decant inlet elevation (operator records)?	626.0		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	625.0		Is water entering inlet, but not exiting outlet?		x
5. Lowest dam crest elevation (operator records)?	629.0		Is water exiting outlet, but not entering inlet?		x
6. If instrumentation is present, are readings recorded (operator records)?	d/n/a		Is water exiting outlet flowing clear?	x	
7. Is the embankment currently under construction?		x	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	n/a		From underdrain?		x
9. Trees growing on embankment? (If so, indicate largest diameter below)		x	At isolated points on embankment slopes?		x
10. Cracks or scarps on crest?		x	At natural hillside in the embankment area?		x
11. Is there significant settlement along the crest?	x		Over widespread areas?		x
12. Are decant trashracks clear and in place?	x		From downstream foundation area?	x	
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		x	"Boils" beneath stream or ponded water?		x
14. Clogged spillways, groin or diversion ditches?		x	Around the outside of the decant pipe?		x
15. Are spillway or ditch linings deteriorated?		x	22. Surface movements in valley bottom or on hillside?		x
16. Are outlets of decant or underdrains blocked?		x	23. Water against downstream toe?	x	
17. Cracks or scarps on slopes?		x	24. Were Photos taken during the dam inspection?	x	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue #	Comments

1. Inspections performed by plant personnel every two weeks. Semi-annual detailed inspection by independent consultant.
2. through 5. No operating records. Data based on design plans and field estimates.
4/11. Emergency overflow spillway according to IPL personnel. Not in design documents. No apparent settlement.
8. Plans do not indicate if foundation was prepared.
9. Brush growing. Largest diameter ~3 inches on south embankment exterior slope.
11. Low spots on east embankment crest from truck traffic hauling ash to Pond E.
18. Sloughing and surface erosion on west embankment above Pond B and C.
21. Moist, soft area at fence-line on south embankment exterior slope.
23. Ponds B & C located at exterior toe of Pond A west embankment.

n/a = Not Available
d/n/a = Does Not Apply

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # IN0004693 INSPECTOR Michael Smith, Michael Schumaker

Date April 28, 2010

Impoundment Name Pond A

Impoundment Company Indianapolis Power & Light Company (IPL)

EPA Region 5

State Agency (Field Office) Addresss 402 West Washington Street, Room W264, Indianapolis, IN 46204

Name of Impoundment Pond A

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?		X
Is water or ccw currently being pumped into the impoundment?	X	

IMPOUNDMENT FUNCTION: Fly Ash, bottom ash, boiler slag, waste water, drainage

Nearest Downstream Town : Name Martinsville, Indiana

Distance from the impoundment 5 miles south

Impoundment Location: Longitude 86 Degrees 25 Minutes 36.64 Seconds W

Latitude 39 Degrees 28 Minutes 51.55 Seconds N

State Indiana County Morgan

Does a state agency regulate this impoundment? YES _____ NO X*

If So Which State Agency?_____

*Indiana Department of Natural Resources (IDNR) is responsible for the State's dam safety program, however IDNR has not been actively involved in the regulation of Coal Combustion Waste Impoundments to date. The owner indicates there are no State inspection reports for this impoundment.

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

_____ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

__X__ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

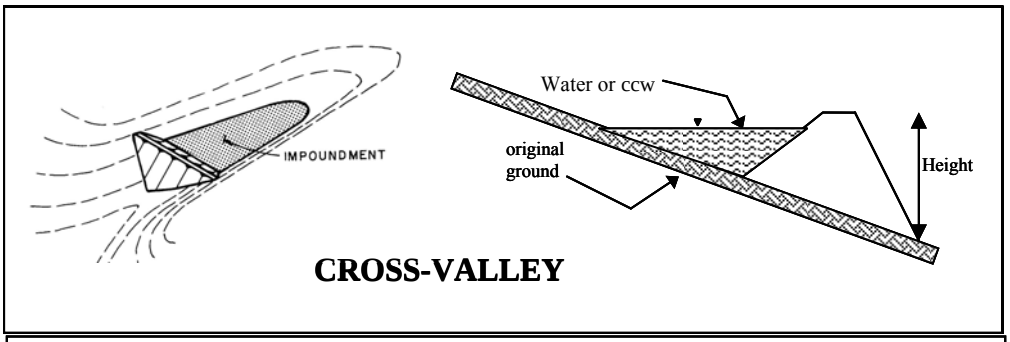
_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

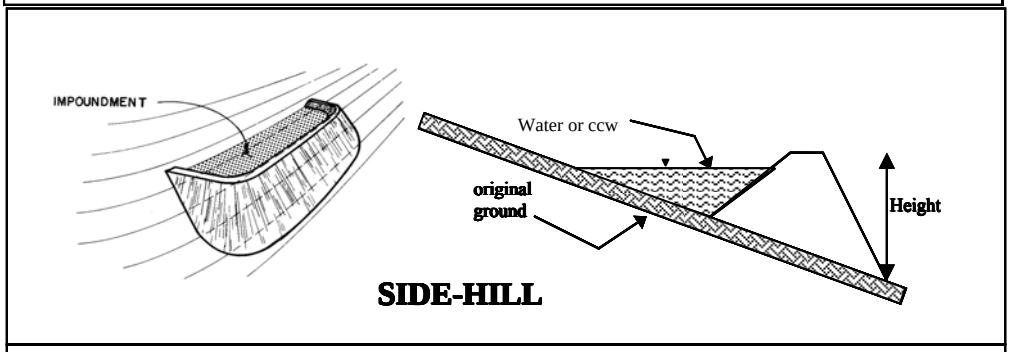
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

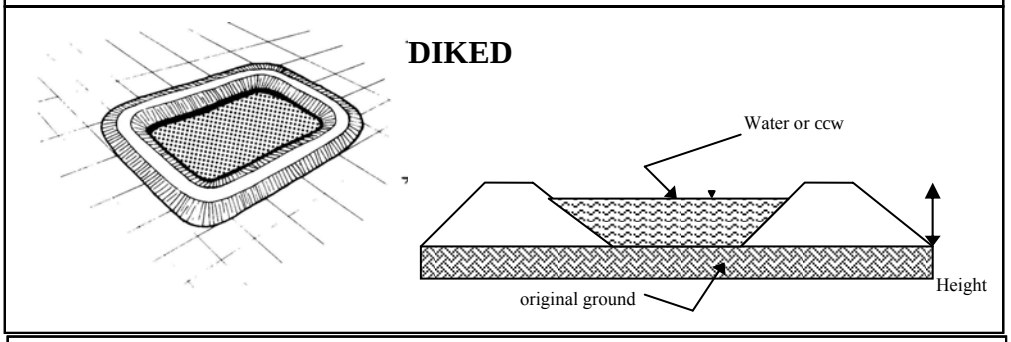
A.) A breach would damage the railroad.

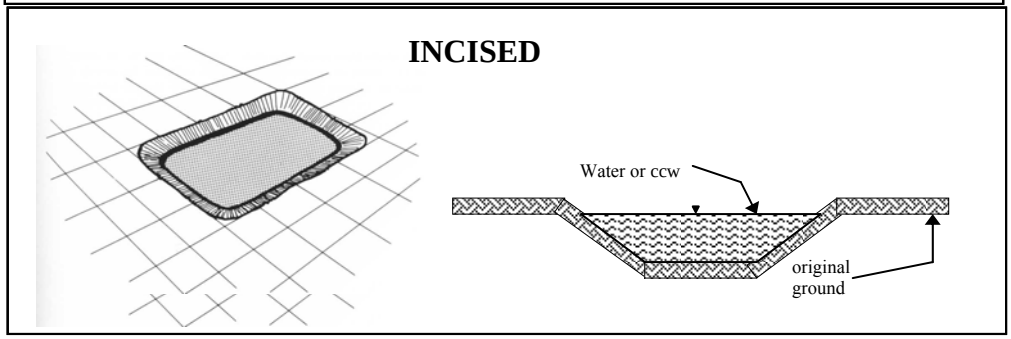
B.) A breach would have an environmental impact on the White River, Discharge Canal, and downstream area.

CONFIGURATION:









_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

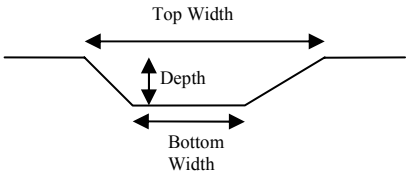
Embankment Height 26 feet
Pool Area 19 acres
Current Freeboard 3 feet
Embankment Material Compacted Fill & Ash
Liner None
Liner Permeability N/A

TYPE OF OUTLET (Mark all that apply)

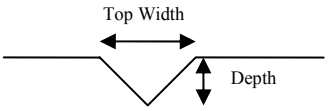
_____ **Open Channel Spillway**
_____ Trapezoidal
X Triangular
_____ Rectangular
_____ Irregular

1 depth
_____ bottom (or average) width
50 top width
_____

TRAPEZOIDAL



TRIANGULAR



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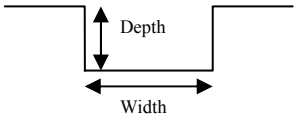
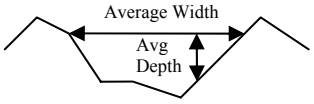
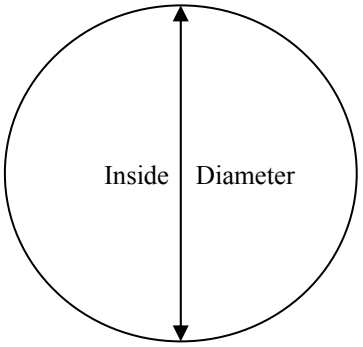


IRREGULAR



X **Outlet**

2 - 30" inside diameter



Material
X corrugated metal
_____ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

_____

Is water flowing through the outlet? YES X NO _____

_____ **No Outlet**

_____

_____ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By Professional Engineers at IPL Corporate
_____

Has there ever been a failure at this site? YES _____ NO X

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO __X____

If So When? _____

IF So Please Describe: ___

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO X

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	IPL Eagle Valley Generating Station	Date:	April 28, 2010
Unit Name:	Pond B	Operator's Name:	Indianapolis Power & Light Company
Unit I.D.:	n/a	Hazard Potential Classification:	High (Significant) Low
Inspector's Name:	Michael Smith, Michael Schumaker		

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	see note 1		18. Sloughing or bulging on slopes?		x
2. Pool elevation (operator records)?	616.0		19. Major erosion or slope deterioration?		x
3. Decant inlet elevation (operator records)?	616.0		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	d/n/a		Is water entering inlet, but not exiting outlet?		x
5. Lowest dam crest elevation (operator records)?	619.0		Is water exiting outlet, but not entering inlet?		x
6. If instrumentation is present, are readings recorded (operator records)?	d/n/a		Is water exiting outlet flowing clear?	x	
7. Is the embankment currently under construction?		x	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	n/a		From underdrain?		x
9. Trees growing on embankment? (If so, indicate largest diameter below)		x	At isolated points on embankment slopes?		x
10. Cracks or scarps on crest?		x	At natural hillside in the embankment area?		x
11. Is there significant settlement along the crest?		x	Over widespread areas?		x
12. Are decant trashracks clear and in place?	x		From downstream foundation area?		x
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		x	"Boils" beneath stream or ponded water?		x
14. Clogged spillways, groin or diversion ditches?		x	Around the outside of the decant pipe?		x
15. Are spillway or ditch linings deteriorated?		x	22. Surface movements in valley bottom or on hillside?		x
16. Are outlets of decant or underdrains blocked?		x	23. Water against downstream toe?	x	
17. Cracks or scarps on slopes?		x	24. Were Photos taken during the dam inspection?	x	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

1. Inspections performed by plant personnel every two weeks. Semi-annual detailed inspection by independent consultant.
2. through 5. No operating records. Data based on design plans and field estimates.
8. Plans do not indicate if foundation was prepared.
23. Pond C located at exterior toe of Pond B north embankment and at exterior toe of Pond A west embankment.

n/a = Not Available
d/n/a = Does Not Apply

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # IN0004693 INSPECTOR Michael Smith, Michael Schumaker

Date April 28, 2010

Impoundment Name Pond B

Impoundment Company Indianapolis Power & Light Company (IPL)

EPA Region 5

State Agency (Field Office) Addresss 402 West Washington Street, Room W264, Indianapolis, IN 46204

Name of Impoundment Pond B

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?		X
Is water or ccw currently being pumped into the impoundment?	X	

IMPOUNDMENT FUNCTION: Fly Ash, bottom ash, boiler slag, waste water, drainage

Nearest Downstream Town : Name Martinsville, Indiana

Distance from the impoundment 5 miles south

Impoundment Location: Longitude 86 Degrees 25 Minutes 37 Seconds W

Latitude 39 Degrees 28 Minutes 57.15 Seconds N

State Indiana County Morgan

Does a state agency regulate this impoundment? YES _____ NO X*

If So Which State Agency?_____

*Indiana Department of Natural Resources (IDNR) is responsible for the State's dam safety program, however IDNR has not been actively involved in the regulation of Coal Combustion Waste Impoundments to date. The owner indicates there are no State inspection reports for this impoundment.

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

_____ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

__X__ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

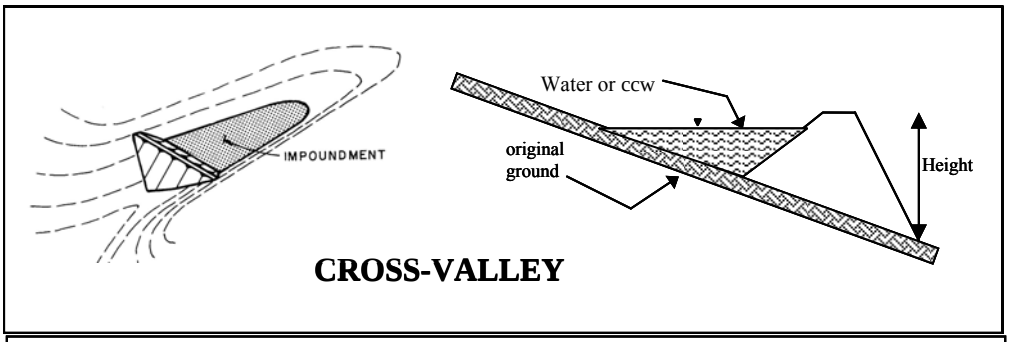
_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

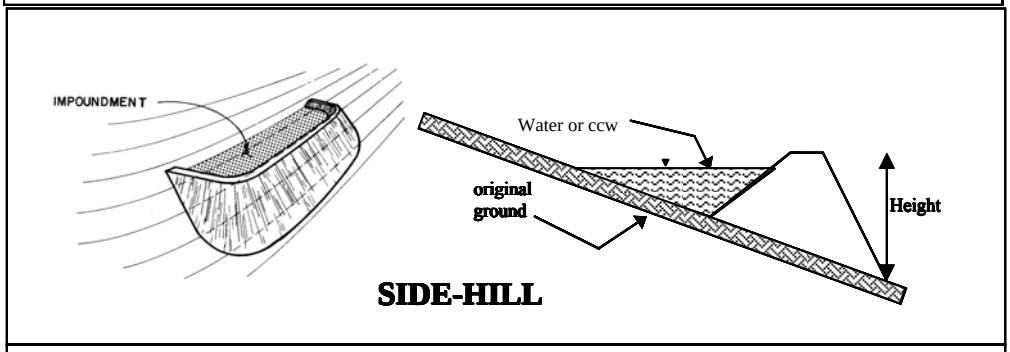
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

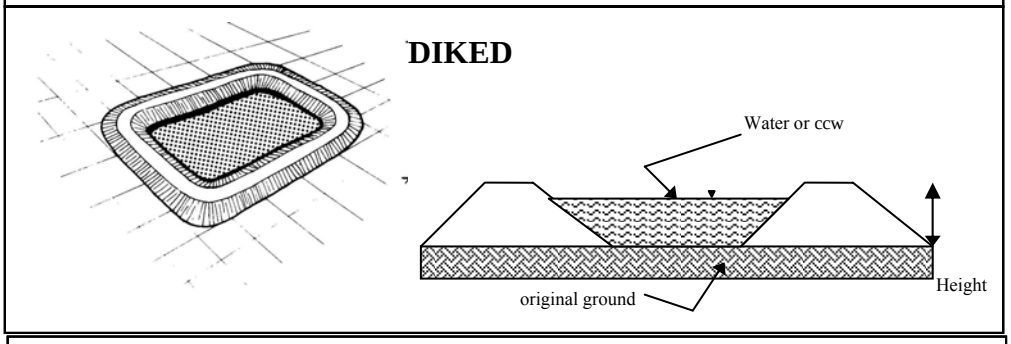
A.) A breach could result in the failure of Pond A or Pond C.

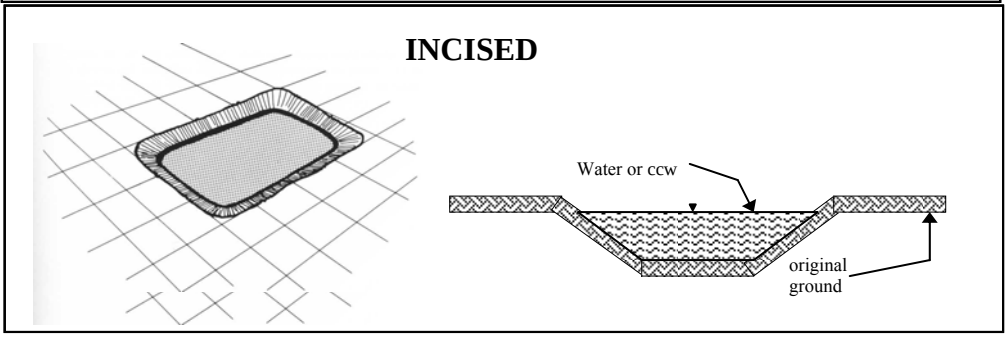
B.) A breach would have an environmental impact on the White River, Discharge Canal, and downstream area.

CONFIGURATION:









_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

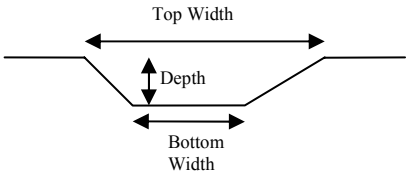
Embankment Height 16 feet
Pool Area 13 acres
Current Freeboard 3 feet
Embankment Material Compacted Fill & Ash
Liner None
Liner Permeability N/A

TYPE OF OUTLET (Mark all that apply)

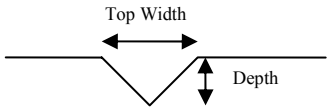
_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

_____ depth
_____ bottom (or average) width
_____ top width
_____

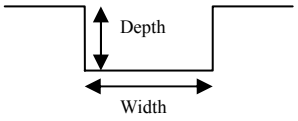
TRAPEZOIDAL



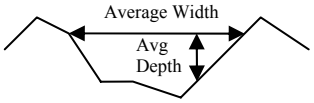
TRIANGULAR



RECTANGULAR

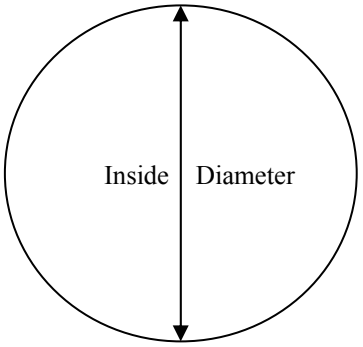


IRREGULAR



X **Outlet**

2 - 30" inside diameter



Material
X corrugated metal
_____ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

_____

Is water flowing through the outlet? YES X NO _____

_____ **No Outlet**

_____

_____ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By Professional Engineers at IPL Corporate
_____

Has there ever been a failure at this site? YES _____ NO X

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO __X____

If So When? _____

IF So Please Describe: ___

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO X

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	IPL Eagle Valley Generating Station	Date:	April 28, 2010
Unit Name:	Pond C	Operator's Name:	Indianapolis Power & Light Company
Unit I.D.:	n/a	Hazard Potential Classification:	High (Significant) Low
Inspector's Name:	Michael Smith, Michael Schumaker		

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	see note 1		18. Sloughing or bulging on slopes?		x
2. Pool elevation (operator records)?	610.0		19. Major erosion or slope deterioration?	x	
3. Decant inlet elevation (operator records)?	610.0		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	d/n/a		Is water entering inlet, but not exiting outlet?		x
5. Lowest dam crest elevation (operator records)?	619.0		Is water exiting outlet, but not entering inlet?		x
6. If instrumentation is present, are readings recorded (operator records)?	d/n/a		Is water exiting outlet flowing clear?	x	
7. Is the embankment currently under construction?		x	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	n/a		From underdrain?		x
9. Trees growing on embankment? (If so, indicate largest diameter below)		x	At isolated points on embankment slopes?		x
10. Cracks or scarps on crest?		x	At natural hillside in the embankment area?		x
11. Is there significant settlement along the crest?		x	Over widespread areas?		x
12. Are decant trashracks clear and in place?	x		From downstream foundation area?		x
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		x	"Boils" beneath stream or ponded water?		x
14. Clogged spillways, groin or diversion ditches?		x	Around the outside of the decant pipe?		x
15. Are spillway or ditch linings deteriorated?		x	22. Surface movements in valley bottom or on hillside?		x
16. Are outlets of decant or underdrains blocked?		x	23. Water against downstream toe?		x
17. Cracks or scarps on slopes?		x	24. Were Photos taken during the dam inspection?	x	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

1. Inspections performed by plant personnel every two weeks. Semi-annual detailed inspection by independent consultant.
2. through 5. No operating records. Data based on design plans and field estimates.
8. Plans do not indicate if foundation was prepared.
19. Erosion on west embankment interior slope from diversion boom cable. Erosion rill on north embankment interior slope at east extent.

n/a = Not Available
d/n/a = Does Not Apply

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # IN0004693 INSPECTOR Michael Smith, Michael Schumaker

Date April 28, 2010

Impoundment Name Pond C

Impoundment Company Indianapolis Power & Light Company (IPL)

EPA Region 5

State Agency (Field Office) Addresss 402 West Washington Street, Room W264, Indianapolis, IN 46204

Name of Impoundment Pond C

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?		X
Is water or ccw currently being pumped into the impoundment?	X	

IMPOUNDMENT FUNCTION: Fly Ash, bottom ash, boiler slag, waste water, drainage

Nearest Downstream Town : Name Martinsville, Indiana

Distance from the impoundment 5 miles south

Impoundment Location: Longitude 86 Degrees 25 Minutes 37.9 Seconds W

Latitude 39 Degrees 29 Minutes 2.71 Seconds N

State Indiana County Morgan

Does a state agency regulate this impoundment? YES _____ NO X*

If So Which State Agency?_____

*Indiana Department of Natural Resources (IDNR) is responsible for the State's dam safety program, however IDNR has not been actively involved in the regulation of Coal Combustion Waste Impoundments to date. The owner indicates there are no State inspection reports for this impoundment.

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

_____ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

__X__ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

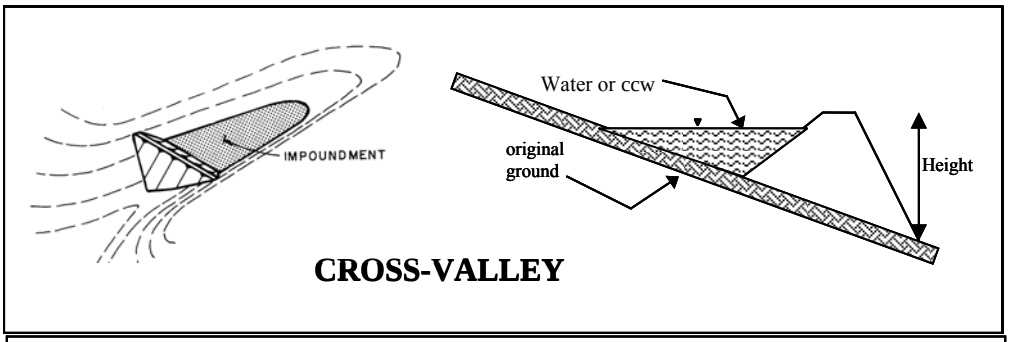
_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

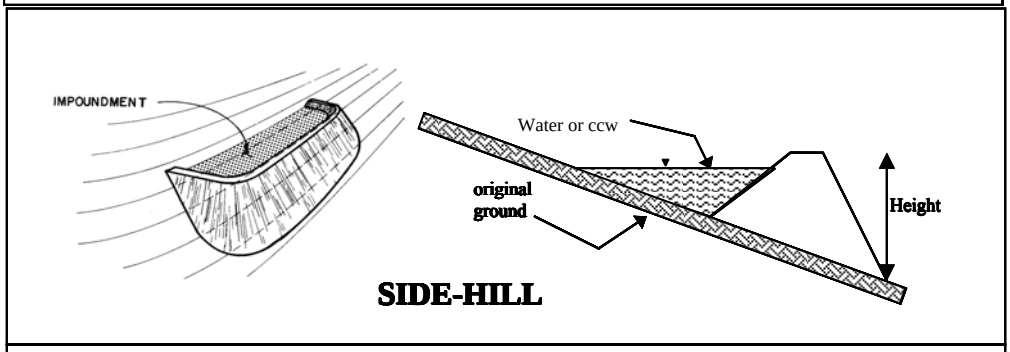
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

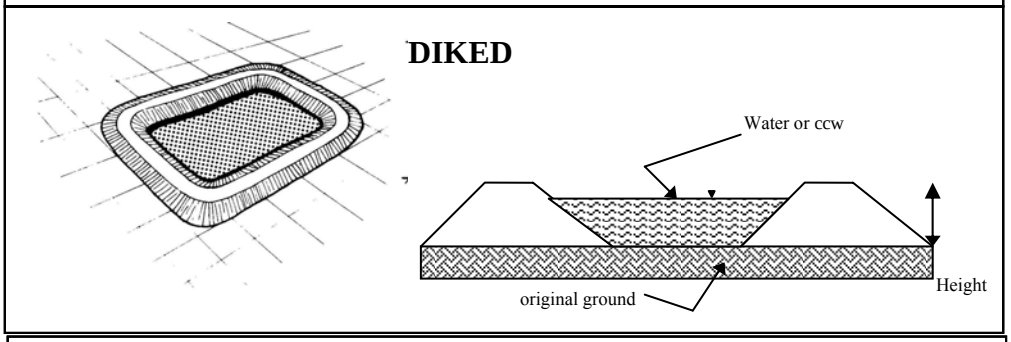
A.) A breach could result in the failure of Pond A or Pond B.

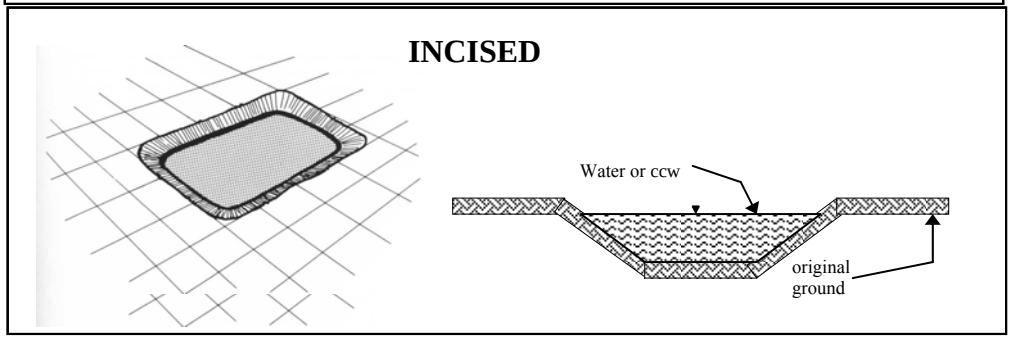
B.) A breach would have an environmental impact on the White River, Discharge Canal, and downstream area.

CONFIGURATION:









_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height 16 feet
Pool Area 8 acres
Current Freeboard 9 feet

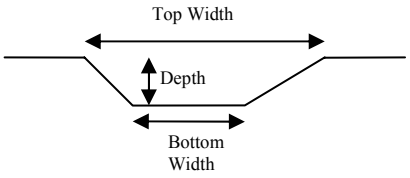
Embankment Material Compacted Fill & Ash
Liner None
Liner Permeability N/A

TYPE OF OUTLET (Mark all that apply)

_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

_____ depth
_____ bottom (or average) width
_____ top width
_____

TRAPEZOIDAL



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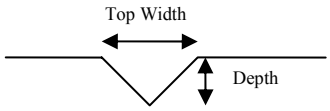
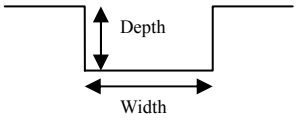
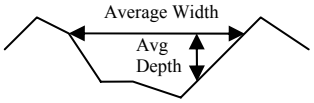


RECTANGULAR

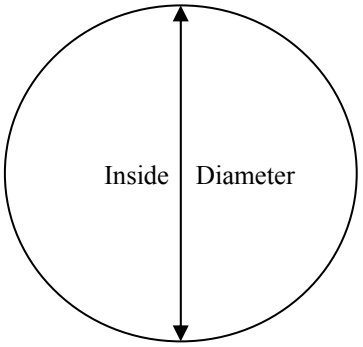


IRREGULAR



X _____ **Outlet**

1 - 24" inside diameter



Material
_____ corrugated metal
X _____ welded steel
X _____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

_____

Is water flowing through the outlet? YES X NO _____

_____ **No Outlet**

_____

X _____ **Other Type of Outlet** (specify) Outlet structure with stop logs and butterfly valve

The Impoundment was Designed By Professional Engineers at IPL Corporate

_____

Has there ever been a failure at this site? YES _____ NO X

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO __X____

If So When? _____

IF So Please Describe: ___

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO X

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	IPL Eagle Valley Generating Station	Date:	April 29, 2010
Unit Name:	Pond D	Operator's Name:	Indianapolis Power & Light Company
Unit I.D.:	n/a	Hazard Potential Classification:	(High) Significant Low
Inspector's Name:	Michael Smith, Michael Schumaker		

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	see note 1		18. Sloughing or bulging on slopes?		x
2. Pool elevation (operator records)?	see note 2		19. Major erosion or slope deterioration?	x	
3. Decant inlet elevation (operator records)?	625.0		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	d/n/a		Is water entering inlet, but not exiting outlet?	d/n/a	
5. Lowest dam crest elevation (operator records)?	643.0		Is water exiting outlet, but not entering inlet?	d/n/a	
6. If instrumentation is present, are readings recorded (operator records)?		x	Is water exiting outlet flowing clear?	d/n/a	
7. Is the embankment currently under construction?	x		21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	n/a		From underdrain?		x
9. Trees growing on embankment? (If so, indicate largest diameter below)		x	At isolated points on embankment slopes?		x
10. Cracks or scarps on crest?		x	At natural hillside in the embankment area?		x
11. Is there significant settlement along the crest?		x	Over widespread areas?		x
12. Are decant trashracks clear and in place?	x		From downstream foundation area?		x
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		x	"Boils" beneath stream or ponded water?		x
14. Clogged spillways, groin or diversion ditches?		x	Around the outside of the decant pipe?		x
15. Are spillway or ditch linings deteriorated?		x	22. Surface movements in valley bottom or on hillside?		x
16. Are outlets of decant or underdrains blocked?		x	23. Water against downstream toe?		x
17. Cracks or scarps on slopes?		x	24. Were Photos taken during the dam inspection?	x	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

1. Inspections performed by plant personnel every two weeks. Semi-annual detailed inspection by independent consultant.
2. Pond D is currently dry. Design elevation is El. 625.
2. through 6. No operating records. Data based on design plans and field estimates. Pond under construction. Piezometers not read by Eagle Valley personnel.
3. Outlet pipeline from Pond D is being routed through Pond E to existing outlet structure in Pond E.
7. Divider embankment is being reconstructed after 1/30/08 breach.
8. Plans do not indicate if foundation was prepared for existing embankment. New embankment foundation prepared.
19. Divider embankment D/E breached on 1/30/08. Embankment being reconstructed. Repair designed by independent consultant Professional Engineer.
20 & 21. Impoundment is drained for repair. Until repairs are complete, impoundment cannot store water.

n/a = Not Available
d/n/a = Does Not Apply

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # IN0004693 INSPECTOR Michael Smith
Michael Schumaker
Date April 29, 2010

Impoundment Name Pond D
Impoundment Company Indianapolis Power & Light Company (IPL)
EPA Region 5
State Agency (Field Office) Addresss 402 West Washington Street, Room W264
Indianapolis, IN 46204

Name of Impoundment Pond D
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?	X	
Is water or ccw currently being pumped into the impoundment?		X

IMPOUNDMENT FUNCTION: Emergency use, usually not active. Fly Ash, bottom ash, boiler slag, waste water, drainage

Nearest Downstream Town : Name Martinsville, Indiana
Distance from the impoundment 5 miles south
Impoundment Location: Longitude 86 Degrees 25 Minutes 20.87 Seconds W
Latitude 39 Degrees 28 Minutes 59.12 Seconds N
State Indiana County Morgan

Does a state agency regulate this impoundment? YES _____ NO X*

If So Which State Agency?_____

*Indiana Department of Natural Resources (IDNR) is responsible for the State's dam safety program, however IDNR has not been actively involved in the regulation of Coal Combustion Waste Impoundments to date. The owner indicates there are no State inspection reports for this impoundment.

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

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_X_ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

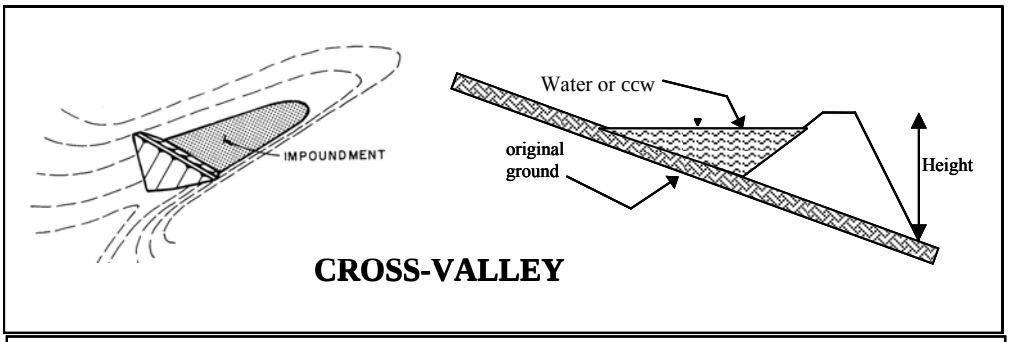
A.) A breach could result in the failure of Pond E.

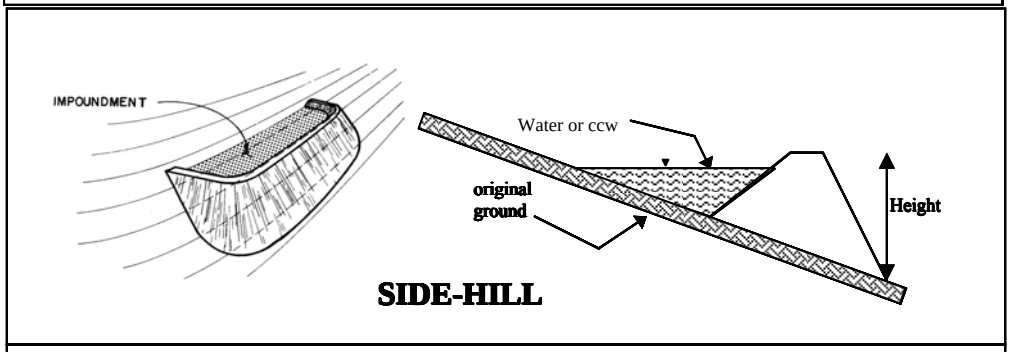
B.) A breach would have an environmental impact on the White River, Discharge Canal, and downstream area.

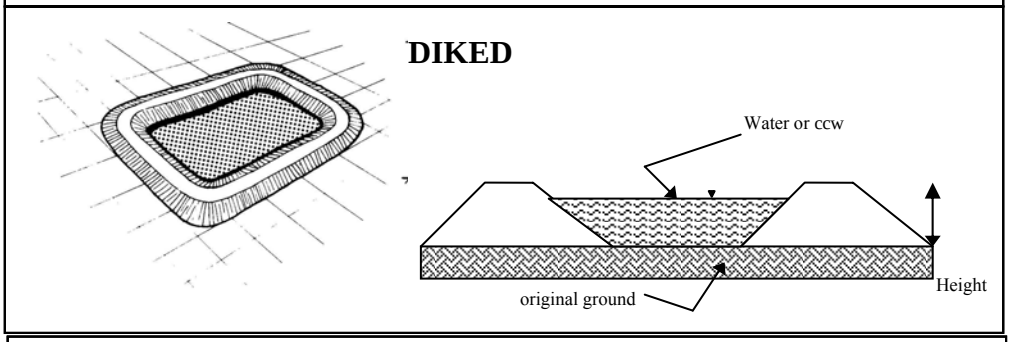
C.) A breach could damage the railroad.

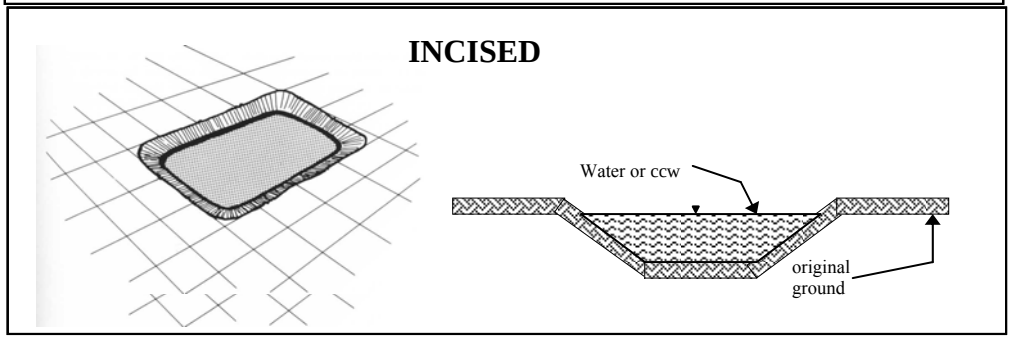
D. A breach or misoperation could cause loss of life at the plant.

CONFIGURATION:









_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

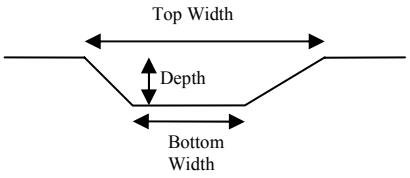
Embankment Height 38 feet
Pool Area 16 acres
Current Freeboard Pond is dry feet
Embankment Material Earthen/Ash
Liner None
Liner Permeability N/A

TYPE OF OUTLET (Mark all that apply)

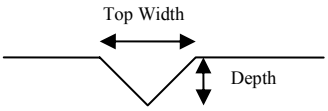
_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

_____ depth
_____ bottom (or average) width
_____ top width
_____

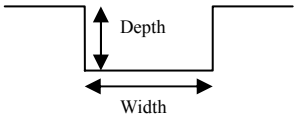
TRAPEZOIDAL



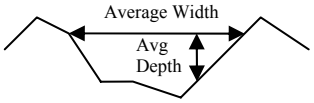
TRIANGULAR



RECTANGULAR

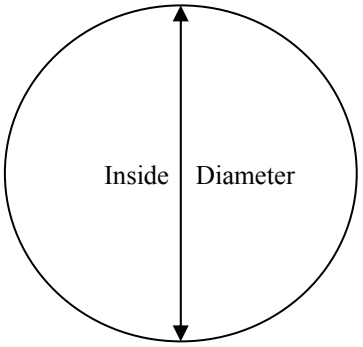


IRREGULAR



X _____ **Outlet**

1 - 30" inside diameter



Material
_____ corrugated metal
_____ welded steel
_____ concrete
HDPE plastic (hdpe, pvc, etc.)
_____ other (specify) _____

_____

Is water flowing through the outlet? YES _____ NO Under construction.

_____ **No Outlet**

_____

_____ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By Prior to 2007 by Professional Engineers at IPL Corporate. 2007 repair by FMSM. 2008 repair by BT^2 Engineering.

Has there ever been a failure at this site? YES X NO _____

If So When? 2/14/07 & 1/30/08

If So Please Describe : _____

The north divider embankment D/E failed for the first time on February 14, 2007. Based on reports by BT^2, water in Pond D was probably at the level of the invert of the outlet pipes that were constructed through north divider embankment D/E (Elevation El. 639.5). Failure appeared to occur at the eastern reach of divider embankment D/E resulting in a semi-circular bowl shaped feature that formed at the north toe of divider embankment D/E and east towards the intersection of northern divider embankment D/E with the western divider embankment D/E and Pond D diversion embankment. Failure of divider embankment D/E caused the north and west embankment of Pond E to be overtopped and then the north embankment of Pond E breached into the discharge canal. BT^2 attributed the failure of divider embankment D/E to slope stability combined with piping erosion of the flyash at the north toe of divider embankment D/E.

IPL began reconstruction of divider embankment D/E and the north embankment of Pond E in the summer of 2007. Construction was completed in November 2007 and the facility was put back in service. Pond D was filled with water to elevation 639.5 by the end of December 2007, and flow of water through the outlet pipes into Pond E began to occur. On January 30, 2008, the north divider embankment D/E failed for a second time. Failure of divider embankment D/E caused the north and west embankment of Pond E to be overtopped and then the north embankment of Pond E breached into the discharge canal. BT^2 completed the design of repairs that are currently under construction.

Has there ever been significant seepages at this site? YES __X_____ NO _______

If So When? Prior to 2007.

IF So Please Describe: Seepage was previously identified on the north embankment exterior slope. A toe drain along the north/northeast embankment toe was installed at some point in time. There are no as-built records on the toe drain. No active seepage was observed in the area of the toe drain and no flowing water was observed at the toe drain outlet sump pit. Pond D is currently dry.

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO X

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	IPL Eagle Valley Generating Station	Date:	April 29, 2010
Unit Name:	Pond E	Operator's Name:	Indianapolis Power & Light Company
Unit I.D.:	n/a	Hazard Potential Classification:	High (Significant) Low
Inspector's Name:	Michael Smith, Michael Schumaker		

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	see note 1		18. Sloughing or bulging on slopes?		x
2. Pool elevation (operator records)?	d/n/a		19. Major erosion or slope deterioration?	x	
3. Decant inlet elevation (operator records)?	620.7		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	d/n/a		Is water entering inlet, but not exiting outlet?	d/n/a	
5. Lowest dam crest elevation (operator records)?	633.0		Is water exiting outlet, but not entering inlet?	d/n/a	
6. If instrumentation is present, are readings recorded (operator records)?		x	Is water exiting outlet flowing clear?	d/n/a	
7. Is the embankment currently under construction?	x		21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	n/a		From underdrain?		x
9. Trees growing on embankment? (If so, indicate largest diameter below)		x	At isolated points on embankment slopes?		x
10. Cracks or scarps on crest?		x	At natural hillside in the embankment area?		x
11. Is there significant settlement along the crest?		x	Over widespread areas?		x
12. Are decant trashracks clear and in place?	x		From downstream foundation area?		x
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		x	"Boils" beneath stream or ponded water?		x
14. Clogged spillways, groin or diversion ditches?		x	Around the outside of the decant pipe?		x
15. Are spillway or ditch linings deteriorated?		x	22. Surface movements in valley bottom or on hillside?		x
16. Are outlets of decant or underdrains blocked?		x	23. Water against downstream toe?		x
17. Cracks or scarps on slopes?		x	24. Were Photos taken during the dam inspection?	x	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

1. Inspections performed by plant personnel every two weeks. Semi-annual detailed inspection by independent consultant.
2. Pond is being backfilled with compacted ash.
3. Outlet pipeline from Pond D will be routed through Pond E to pipeline connected to Pond C.
4. through 6. No operating records. Data based on design plans and field estimates. Pond under construction. Piezometers not read by Eagle Valley personnel.
7. Divider embankment D/E and Pond E north embankment are being reconstructed after 1/30/08 breach. Pond E is being filled with compacted ash (Pond E is being filled but not being closed).
8. Plans do not indicate if foundation was prepared for existing embankment. Embankment foundation prepared for repair work.
19. Divider embankment D/E breached on 1/30/08. Breach resulted in Pond E north embankment being overtopped. North embankment breached. Large erosion features on west and north embankment exterior slope. Embankment and erosion being repaired. Repair designed by independent consultant Professional Engineer.
20 & 21. Impoundment is drained for reconstruction and is being filled with ash.

n/a = Not Available
d/n/a = Does Not Apply

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # IN0004693 INSPECTOR Michael Smith, Michael Schumaker

Date April 29, 2010

Impoundment Name Pond E

Impoundment Company Indianapolis Power & Light Company (IPL)

EPA Region 5

State Agency (Field Office) Addresss 402 West Washington Street, Room W264, Indianapolis, IN 46204

Name of Impoundment Pond E

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?	X	
Is water or ccw currently being pumped into the impoundment?		X

IMPOUNDMENT FUNCTION: Fly ash, bottom ash, boiler slag

Nearest Downstream Town : Name Martinsville, Indiana

Distance from the impoundment 5 miles south

Impoundment Location: Longitude 86 Degrees 25 Minutes 24.11 Seconds W

Latitude 39 Degrees 28 Minutes 03.81 Seconds N

State Indiana County Morgan

Does a state agency regulate this impoundment? YES _____ NO X*

If So Which State Agency?_____

*Indiana Department of Natural Resources (IDNR) is responsible for the State's dam safety program, however IDNR has not been actively involved in the regulation of Coal Combustion Waste Impoundments to date. The owner indicates there are no State inspection reports for this impoundment.

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

_____ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

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_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

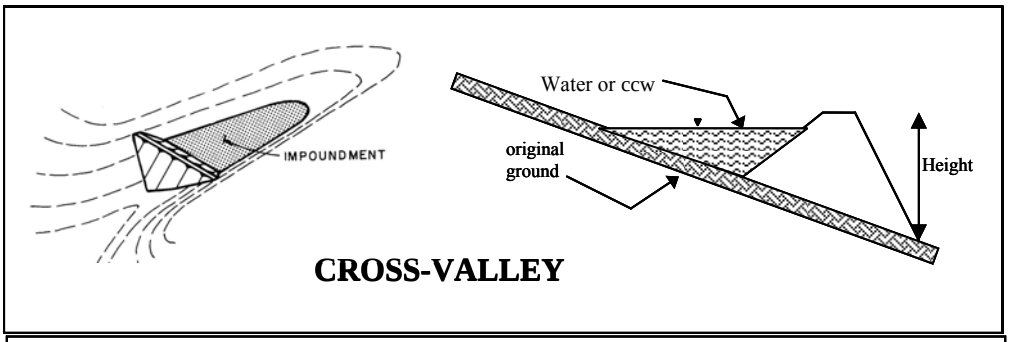
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

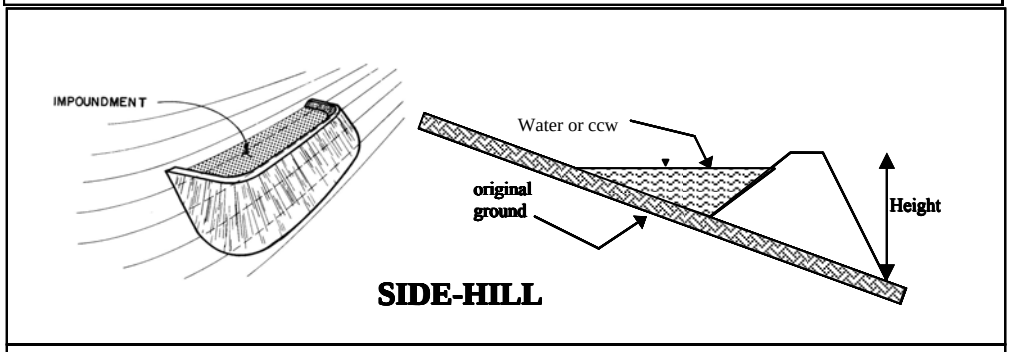
A.) A breach could result in the failure of Pond D.

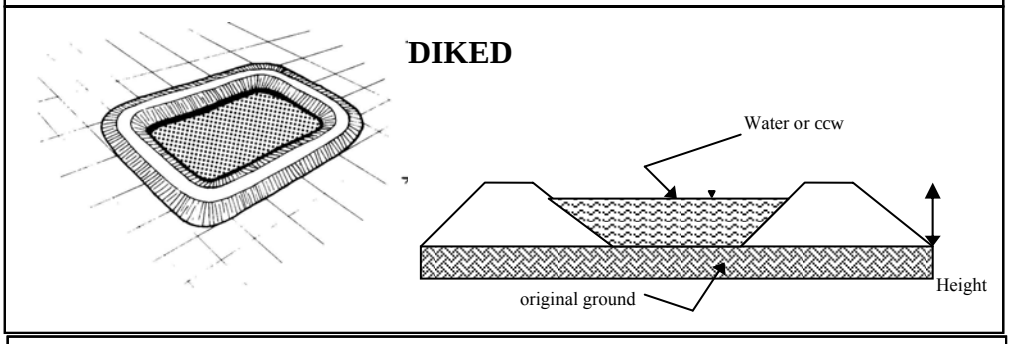
B.) A breach would have an environmental impact on the White River, Discharge Canal, and downstream area.

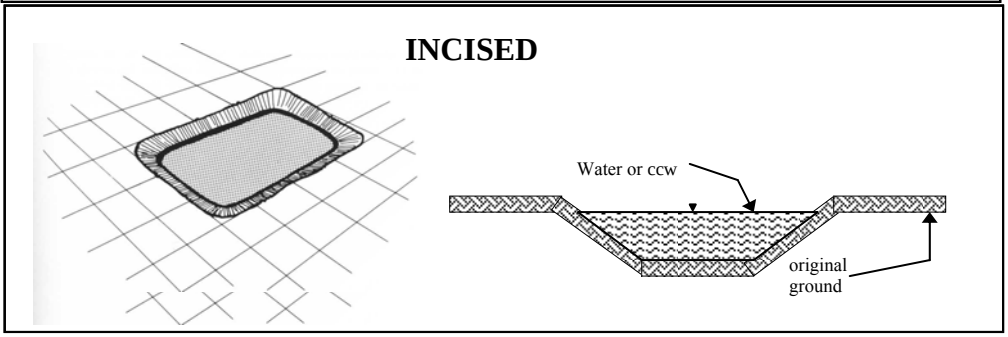
C.) A breach could damage the railroad.

CONFIGURATION:







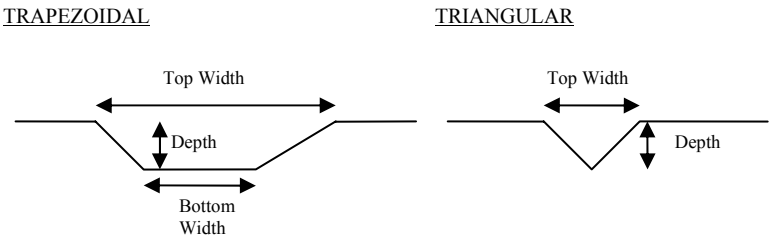


_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

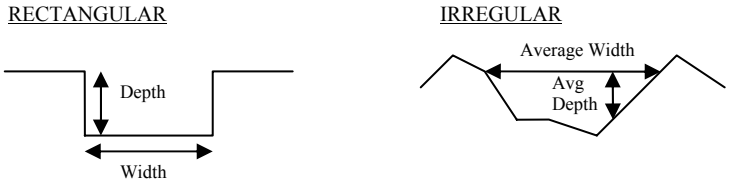
Embankment Height 28 feet
Embankment Material Compacted fill & Ash
Pool Area 4 acres
Liner None
Current Freeboard Pond is dry feet
Liner Permeability N/A

TYPE OF OUTLET (Mark all that apply)

_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

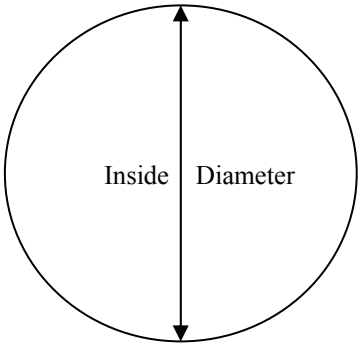


_____ depth
_____ bottom (or average) width
_____ top width
_____



X_____ **Outlet**

1 - 24" inside diameter



Material
_____ corrugated metal
_____ welded steel
_X___ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

_____

Is water flowing through the outlet? YES _____ NO Under construction.

_____ **No Outlet**

_____

_____ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By Prior to 2007 by Professional Engineers at IPL Corporate. 2007 repair by FMSM. 2008 repair by BT^2 Engineering.

Has there ever been a failure at this site? YES X NO _____

If So When? 2/14/07 & 1/30/08

If So Please Describe : _____

The north divider embankment D/E failed for the first time on February 14, 2007. Based on reports by BT^2, water in Pond D was probably at the level of the invert of the outlet pipes that were constructed through north divider embankment D/E (Elevation El. 639.5). Failure appeared to occur at the eastern reach of divider embankment D/E resulting in a semi-circular bowl shaped feature that formed at the north toe of divider embankment D/E and east towards the intersection of northern divider embankment D/E with the western divider embankment D/E and Pond D diversion embankment. Failure of divider embankment D/E caused the north and west embankment of Pond E to be overtopped and then the north embankment of Pond E breached into the discharge canal. BT^2 attributed the failure of divider embankment D/E to slope stability combined with piping erosion of the flyash at the north toe of divider embankment D/E.

IPL began reconstruction of divider embankment D/E and the north embankment of Pond E in the summer of 2007. Construction was completed in November 2007 and the facility was put back in service. Pond D was filled with water to elevation 639.5 by the end of December 2007, and flow of water through the outlet pipes into Pond E began to occur. On January 30, 2008, the north divider embankment D/E failed for a second time. Failure of divider embankment D/E caused the north and west embankment of Pond E to be overtopped and then the north embankment of Pond E breached into the discharge canal. BT^2 completed the design of repairs that are currently under construction.

Has there ever been significant seepages at this site? YES _____ NO __X____

If So When? _____

IF So Please Describe: ___

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO X

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Appendix B
Photographs

1. Pond A – East embankment exterior slope looking south.

2. Pond A – East embankment crest looking south.

3. Pond A – East embankment exterior slope. Erosion control blanket installed near northeast corner looking southeast. Note: Blanket appears to be improperly staked, there are 1- to 3-inch gaps beneath the blanket, and there is no apparent anchor trench or roll overlap.

4. Pond A – East embankment exterior slope. Erosion control blanket installed near northeast corner looking northwest.

5. Pond A – East exterior slope looking south. Low spot and minor slough at toe of slope.. Possible tractor rutting.

6. Overview of two 10-inch-diameter HDPE discharge pipes into Pond A, looking northwest.

7. Pond A – depression near crest of east embankment, looking north.

8. Overview of three 10-inch-diameter HDPE discharge pipes into Pond A, looking southwest. Note two right-most pipes are disconnected.

9. Overview of Pond D west embankment exterior slope from toe of Pond A east embankment. Note change in vegetation type at the three vertical expansions.

10. Overview of 10-inch-diameter HDPE discharge pipe into Pond A, looking west.

11. Overview of ash excavation in Pond A looking west. Ash being used as fill to repair Ponds D and E..

12. Pond A looking north - Possible former seep location at toe of east embankment.,.

13. Overview of Pond A from crest of southeast corner looking northwest.

14. Pond A – Depression in crest from truck traffic, looking south.

15. Pond A – East embankment exterior slope looking north.

16. Pond A – East crest looking north.

17. Pond A – Downstream area of east embankment looking southeast.

18. Pond A – Downstream area of east embankment at southeast corner of embankment looking south.

19. Pond A – South embankment crest looking west.

20. Pond A – South embankment exterior slope looking west.

21. Pond A – Soft spongy area at toe of south embankment under tree canopy (possible former active seepage area).

22. Pond A – South embankment crest, looking west.

23. Pond A – South embankment exterior slope, looking southeast.

24. Pond A – South embankment crest, looking southeast.

25. Pond A – West embankment exterior slope, looking north.

26. Pond A – Erosion rill on west embankment exterior slope, looking east.

27. Pond A – West embankment crest, looking south.

28. Pond A/B – north slope of divider embankment, looking east.

29. Pond A/B – south slope of divider embankment, looking east.

30. Pond A/B – crest of divider embankment, looking east.

31. Overview of Pond B & C from crest of Pond A, looking northeast.

32. Depression in north slope of Pond A/B divider embankment.

33. North slope of divider embankment A/B and Pond B west embankment, looking southwest.

34. Crest of divider embankment A/B, looking northeast.

35. Erosion feature and depression in north slope of divider embankment A/B.

36. Depression in north slope of divider embankment A/B.

37. Depression in northwest slope of divider embankment A/B.

38. Northwest slope of divider embankment A/B, looking south.

39. Crest of divider embankment B/C from crest of Pond A, looking west.

40. West slope of divider embankment A/C from Pond B, looking north.

41. Minor sloughing and erosion feature on west slope of divider embankment A/C.

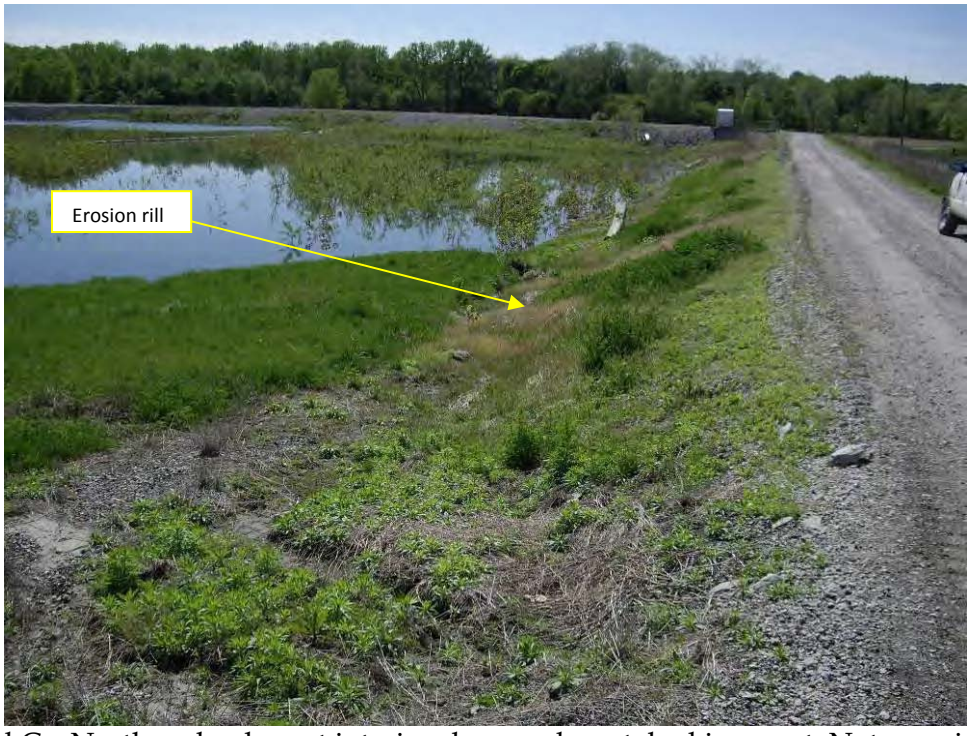
42. West slope of divider embankment A/C from Pond C north embankment, looking south.

43. Crest of divider embankment A/C from Pond C north embankment, looking south.

44. Pond A – North embankment crest, looking east.

45. Pond A – North embankment exterior slope, looking east.

46. Pond C – North embankment exterior slope, looking west.



47. Pond C – North embankment interior slope and crest, looking west. Note erosion rill on interior slope.

48. Pond C – North embankment crest, looking east.

49. Pond C – North embankment interior slope, looking east. Note brush and limited riprap on slope.

50. Pond C – North embankment exterior slope, looking east.

51. Pond C – West embankment interior slope, looking south.

52. Pond C – West embankment crest, looking south.

53. Pond C – West embankment exterior slope, looking south.

54. Pond C – Outlet structure gatehouse. Note stoplogs and butterfly valve in catwalk.

55. Pond C – Erosion feature from diversion boom tie line.

56. Pond C – West embankment crest, looking north

57. Crest of divider embankment B/C, looking east.

58. South slope of divider embankment B/C, looking east.

59. North slope of divider embankment B/C looking east.

60. Pond B – west embankment crest, looking south.

61. Pond B – west embankment exterior slope, looking south.

62. Pond B – west embankment interior slope, looking north

63. Pond B – west embankment crest, looking north

64. Pond B – west embankment exterior slope, looking north

65. Pond B – erosion rill on exterior slope recently filled in with riprap, looking east.

66. Pond C – Outlet structure outfall to discharge canal, looking south.

67. Pond D – east embankment exterior slope, looking southwest.

68. Pond D – east embankment crest, looking southwest.

69. Pond D – north embankment crest, looking northwest.

70. Pond D – north embankment toe drain sump pit located in northeast downstream area.

71. Pond D – East embankment downstream area looking southeast. Note new piping for Ponds D & E.

72. Pond D – Erosion rill and depression on east embankment buttress berm, looking south.

73. Pond D – Erosion rill on east embankment buttress berm, looking northeast

74. Pond D – Crest of east embankment buttress berm, looking north

75. Pond D – Crest of east embankment buttress berm, looking south

76. Pond D – Southeast embankment exterior slope, looking southwest.

77. Pond D – Southeast embankment crest, looking southwest.

78. Piezometer PZ-2 on Pond D east embankment crest installed by BT² on 6/12/08.

79. Pond D – Southeast embankment interior area, looking southwest

80. Pond D - Large bare spot on upper third of southeast embankment exterior slope, looking northwest.

81. Typical bare spots on upper third of Pond D exterior embankment (last expansion).

82. Pond D - Erosion rill on southeast embankment exterior slope, looking northwest.

83. Pond D – Southeast embankment exterior slope, looking northeast.

84. Pond D – Southeast embankment crest, looking northeast.

85. Pond D – Erosion rill on southeast embankment exterior slope, looking southeast.

86. Pond D – Southwest corner of southeast embankment exterior slope downstream area, looking southeast.

87. Pond D – West embankment crest, looking north

88. Pond D – West embankment interior slope, looking north.

89. Pond D – West embankment exterior slope, looking north. Note bands of vegetation from the vertical expansions. Bare spots observed on upper third.

90. Pond D – Typical bare spots on upper third of west embankment exterior slope, looking south.

91. Pond D – West embankment exterior slope, looking south.

92. Pond D – West embankment interior slope, looking south at edge of ash limit prior to Pond D/E embankment failure.

93. Pond D – West embankment interior slope, looking north toward divider embankment D/E.

94. Overview of Pond D, south slope of divider embankment D/E, and west slope of Pond D divider embankment. Note breach (circled) in divider embankment D/E.

95. Overview of Pond D and west slope of Pond D divider embankment, looking east.

96. Pond D – West embankment typical interior slope with shale armor near crest.

97. Pond D – Typical bare spot and erosion on west embankment exterior slope, looking southeast.

98. Pond D – West embankment exterior slope at toe, looking north.

99. North slope of divider embankment D/E, looking east.

100. Crest of divider embankment D/E, looking east.

101. South slope of divider embankment D/E, looking east.

102. Overview of cut in divider embankment D/E for repair work.

103. North slope of divider embankment D/E, looking west.

104. Overview of Pond E backfilling operation and Pond E outlet structure, looking northwest.

105. Pond E – West embankment exterior slope, looking north.

106. Pond E – 16'Wx4'Dx17'L erosion gulley at toe of west embankment exterior slope from previous failure event. Note erosion is scheduled to be repaired.

107. Pond E – 8′Wx4.5′Dx15′L erosion gulley at crest of west embankment exterior slope from previous failure event. Note erosion is scheduled to be repaired.

108. Overview of discharge manholes from Pond E into Pond C, looking northwest.

109. Pond E – West embankment interior slope, looking south.

110. Pond E – West embankment crest, looking south.

111. Pond E – West embankment exterior slope, looking south.

112. Pond E – 8′Wx3′Dx25′L erosion gulley at mid-slope of west embankment exterior slope from previous failure event. Note erosion is scheduled to be repaired.

113. Pond E – two approximately 4'Wx3'Dx20'L erosion gulleys at mid-slope of west embankment exterior slope from previous failure event. Note erosion is scheduled to be repaired.

114. Pond E – Downstream area looking south toward failure repair (reconstruction of north embankment).

115. Pond E – Overview of outlet control structure with stoplogs and butterfly valve, looking northwest.

116. Pond E – Overview of north embankment reconstruction, looking east.

117. Overview of divider embankment D/E reconstruction and Pond E filling operation, looking south.

118. Overview of divider embankment D/E reconstruction, looking south.

119. Pond E – erosion feature on north embankment exterior slope from previous failure event.

120. Pond E – Overview of north embankment reconstruction, looking west.

121. Crest of divider embankment D/E, looking south.

122. West slope of divider embankment D/E, looking south.

123. East slope of divider embankment D/E, looking south.

124. Overview of divider embankment D/E reconstruction, looking west.

125. West slope of divider embankment D/E, looking north. Note pipes removed from embankment after breach.

126. Pond D - Erosion rill on west slope of divider embankment, looking southwest.

127. Pond D - Erosion feature on east slope of divider embankment, looking east.

128. Pond D - Limit of ash at end of divider embankment prior to failure, looking southwest.

129. Pond D – Crest of divider embankment, looking north.

130. Pond D – Depression with piping on east slope of divider embankment, looking northeast.

131. Pond D – North embankment exterior slope, looking east.

132. Pond D – North embankment crest, looking east.

133. Pond D – North embankment interior slope, looking east.

134. Pond D – Toe of north embankment, looking east. Note drainage ditch with seepage collector pipe.

135. Pond D – North embankment exterior slope, looking southeast.

136. Overview of downstream area north of Pond D and Pond E. Note repair of erosion areas which resulted from breach.

137. Pond D – Northeast embankment exterior slope, looking southeast.

138. Pond D – Northeast embankment crest, looking southeast.

139. Pond D – Northeast embankment interior slope, looking southeast.

140. Overview of three 10-inch-diameter HDPE discharge pipes into Pond D, looking southwest.

141. Pond D – Northeast embankment interior slope, looking northwest.

142. Pond D – Northeast embankment crest, looking northwest.

143. Pond D – Northeast embankment exterior slope, looking northwest.

144. Access road and discharge canal adjacent to toe of Pond D, looking northwest.

145. Downstream area of Pond D northeast embankment, looking east.

146. Overview of typical discharge canal adjacent the north embankments of Ponds A, C, D, and E.

Appendix C
Photo GPS Locations

Appendix C
Photo GPS Locations

Site: IPL Eagle Valley Generating Station
System: US State Plane 1983
Zone: Indiana West 1302
Datum: NAD 1983 (Consus)
Coordinate Units: Feet

Photo No.	Northing	Easting
1 and 2	1,543,724.35	3,138,521.78
3	1,543,656.13	3,138,510.32
4	1,543,603.59	3,138,555.22
5	1,543,405.39	3,138,526.61
6	1,543,270.13	3,138,477.08
7	1,543,135.76	3,138,477.58
8	1,542,878.99	3,138,435.61
9	1,542,852.72	3,138,493.47
10	1,542,704.42	3,138,412.83
11	1,542,684.55	3,138,421.44
12	1,542,179.67	3,138,436.85
13 and 16	1,542,034.42	3,138,389.96
14	1,542,075.03	3,138,400.5
15	1,542,024.14	3,138,417.73
17 and 18	1,541,968.85	3,138,418.05
19 and 20	1,541,998.01	3,138,346.89
21	1,541,943.92	3,138,156.19
22	1,541,944.92	3,137,334.99
23	1,542,182.81	3,137,035.99
24	1,542,197.05	3,137,070.36
25 and 26	1,542,211.29	3,137,020.51
27	1,542,327.56	3,137,102.51
28 and 29	1,542,338.39	3,137,143.13
30 and 31	1,542,308.	3,137,114.16
32	1,542,506.98	3,137,820.9
33	1,542,578.25	3,137,910.31
34	1,542,590.98	3,137,929.74
35	1,542,812.37	3,138,067.58
36	1,542,904.44	3,138,091.21
37	1,542,940.83	3,138,103.52
38, 39, and 40	1,543,177.34	3,138,239.04
41	1,543,550.93	3,138,279.92
42 and 43	1,543,714.7	3,138,278.71
44	1,543,731.39	3,138,301.4
45	1,543,759.5	3,138,287.82
46	1,543,777.46	3,138,487.96
47	1,543,749.03	3,138,211.98
48 and 50	1,543,745.97	3,137,779.66
49	1,543,726.09	3,137,779.65
51, 52, and 53	1,543,730.53	3,137,752.09
54	1,543,677.39	3,137,729.7
56	1,543,524.48	3,137,665.63
57, 58, and 59	1,543,248.57	3,137,522.36
60	1,543,221.76	3,137,527.13

Appendix C
Photo GPS Locations

Site: IPL Eagle Valley Generating Station
System: US State Plane 1983
Zone: Indiana West 1302
Datum: NAD 1983 (Consus)
Coordinate Units: Feet

Photo No.	Northing	Easting
61	1,543,248.08	3,137,490.37
62 and 63	1,542,477.64	3,137,152.74
64	1,542,490.73	3,137,163.95
65	1,542,496.09	3,137,134.06
66	1,543,842.49	3,137,769.45
67	1,543,430.99	3,139,729.52
68 and 69	1,543,439.08	3,139,698.29
70	1,543,487.25	3,139,843.73
71	1,543,355.19	3,139,793.91
72 and 73	1,543,166.46	3,139,799.91
74 and 75	1,543,081.92	3,139,651.69
76	1,542,880.82	3,139,609.81
77 and 78	1,542,916.59	3,139,556.43
79	1,542,934.69	3,139,523.09
80 and 81	1,542,831.54	3,139,531.16
82	1,542,759.24	3,139,413.97
83 and 84	1,542,248.15	3,138,816.22
85	1,542,235.44	3,138,761.94
86	1,542,244.39	3,138,724.45
87, 88, and 89	1,542,270.15	3,138,729.15
90	1,542,626.21	3,138,721.5
91	1,542,791.47	3,138,657.6
92, 93, and 94	1,542,857.21	3,138,778.42
95	1,542,884.1	3,138,816.68
96	1,543,077.29	3,138,846.65
97	1,543,163.94	3,138,761.42
98	1,543,418.22	3,138,716.36
99, 100, and 101	1,543,392.1	3,138,841.03
102	1,543,383.45	3,139,067.18
103 and 104	1,543,433.06	3,139,084.42
105	1,543,423.28	3,138,771.89
106	1,543,512.46	3,138,723.86
107	1,543,595.04	3,138,770.43
108	1,543,648.62	3,138,799.28
109, 110, and 111	1,543,652.1	3,138,804.81
112	1,543,682.25	3,138,788.52
113	1,543,730.84	3,138,772.95
114	1,543,812.68	3,138,779.48
115	1,543,717.59	3,138,866.98
116	1,543,743.89	3,138,952.33
117 and 118	1,543,747.36	3,139,135.1
119	1,543,808.16	3,139,192.92
120, 121, 122, and 123	1,543,724.66	3,139,313.03
124 and 125	1,543,382.61	3,139,258.73

Appendix C
Photo GPS Locations

Site: IPL Eagle Valley Generating Station
System: US State Plane 1983
Zone: Indiana West 1302
Datum: NAD 1983 (Consus)
Coordinate Units: Feet

Photo No.	Northing	Easting
126	1,543,188.92	3,139,289.02
127 and 128	1,542,981.47	3,139,284.07
129	1,543,019.94	3,139,286.84
130	1,543,167.72	3,139,297.94
131, 132, and 133	1,543,728.52	3,139,330.12
134	1,543,815.6	3,139,328.12
135	1,543,865.25	3,139,305.49
136	1,543,719.1	3,139,509.71
137	1,543,717.47	3,139,557.47
138, 139, and 140	1,543,689.72	3,139,535.69
141, 142, and 145	1,543,476.56	3,139,687.13
143	1,543,501.97	3,139,741.64
144	1,543,523.14	3,139,781.15
146	1,543,556.85	3,139,979.66